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BBC ACORN USER



ONE TO 3000

The Acorn family tree

THE 1989 BBC ACORN USER show

Details inside

CUSTOM DRUIDS:
Expanding the game

MULTISYNC MONITORS:
Three for the Arc

CLOAK AND DAGGER:
Protecting programs

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BBC ACORN USER

ISSUE NO 85 AUG 1989

COVER



COVER FEATURE
The Acorn family tree from the System One to the A3000.

Cover photo by James Johnson

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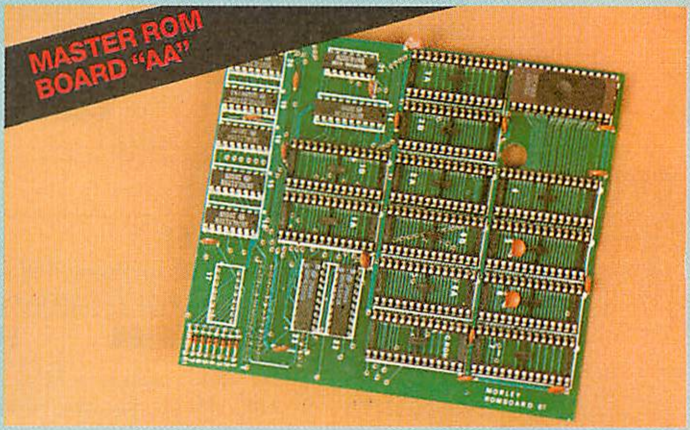
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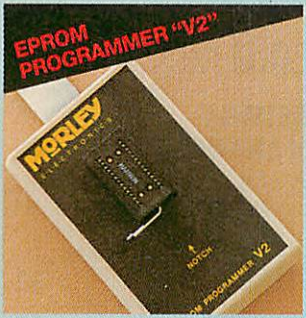
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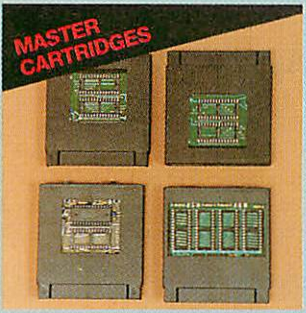
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NEWS

End of UK IT?

Acorn's managing director Harvey Coleman has condemned the government's IT policy predicting it threatens to destroy Britain's struggling computer industry.

The Acorn boss delivered the warning to the all-party Parliamentary Information Technology Committee.

The committee has been considering the government's White Paper response to the Trade and Industry Select Committees' highly critical report on Britain's IT prospects. It focused particularly on current Whitehall thinking which believes there is no need to maintain the expense of a home-based IT industry.

Instead, ministers argue, it is better to 'buy in' the best equipment wherever it is produced and then learn how to make best use of it.

Coleman fears the policy is short-sighted. 'To fail to have an indigenous IT industry would be a fatal flaw,' he forecast.

As an alternative, Coleman spelt out his vision of a British IT industry determining its own R&D policies for its own markets.

Bill Penfold

Desktop quintet

Desktop publishing is rapidly becoming the Archimedes' forte with five packages either recently launched or to be available in the near future.

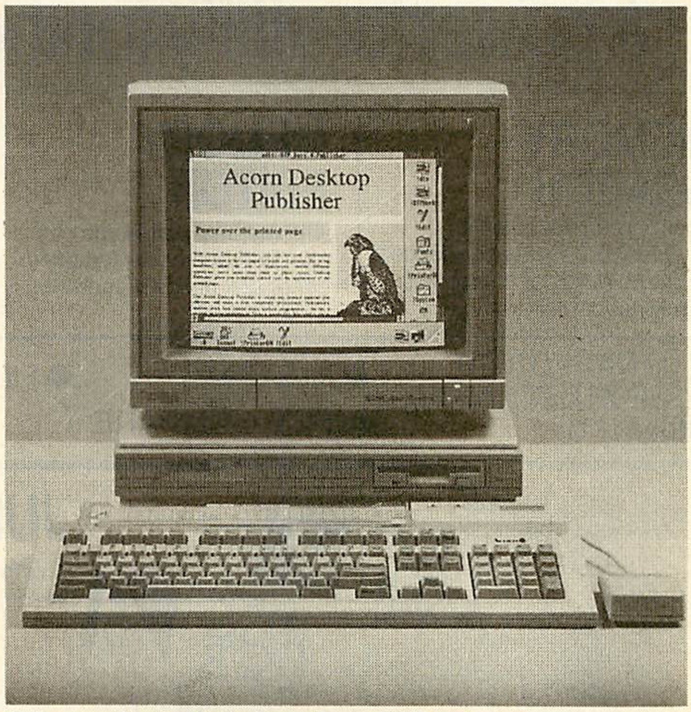
On sale now for a cost of £171 is Acorn's Risc OS compatible *Desktop Publisher* which has already attracted several hundred orders.

One interesting aspect of *Desktop Publisher* is the ability to scale fonts in real time. The package will also drive a wide range of printers all the way from cheap 9-pin dot-matrix machines to laser printers featuring page description languages.

In direct competition are Computer Concepts' £173 *Impression* (see May 1989 *BAU* news) and Beebug's forthcoming DTP package to be released this summer, also costing about £173.

Described as being 'much along the lines of Apple Mac packages', Beebug says its offering may feature a draught mode which will allow users to quickly dump provisional results onto a standard dot-matrix printer.

AVP has rewritten its *Pixel Perfect* DTP package to take advantage of Risc OS. Some of the new features include the automatic flowing of text from one page to the next and addition to the facilities for drawing and manipulating geometric shapes.



Orders are flooding in for Acorn's new DTP package

Any part of a page can be instantly copied and expanded or reduced by using the mouse pointer and then either pasted back onto the page or saved to disc.

Newcomer Mach Technology says it is also developing its own DTP system which the company will be previewing at the *BBC Acorn User* Show this month. Finally, LTS has released version two of its *Newsmaster* package which features significantly higher printing resolution.

Further details from Acorn on (0223) 245 200, Computer Concepts on (0442) 63933, Beebug on (0727) 40303, AVP on (0291) 625439, Mach Technology on (0787) 238125 and LTS on (0386) 792617.

Massive Arc space game uses seven discs

A colossal Archimedes space adventure simulation which is due to be released in August looks set to take over from *Elite* as to end all others.

Supplied on seven discs for about £50, *Karma* is being developed by newcomer Periscope Software.

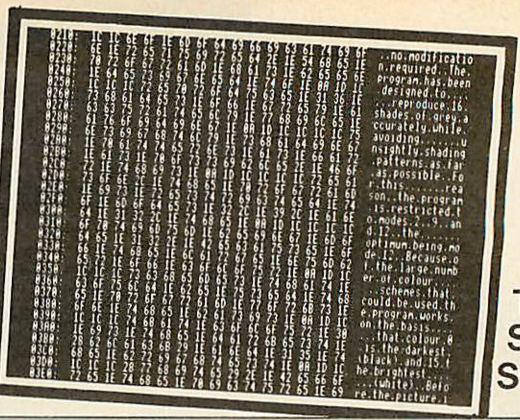
The game's plot is based around an advanced civilisation which inhabits a galaxy near the centre of the universe. Two independently controlled spacecraft are used for the overall objective and according to Periscope there are 'plenty of opportunities for both exploration and combat.'

The game will also feature fully animated, three dimensional objects with source sensitive point of light shading and over 18,000 stars, planets and moons which are individually calculated for size, mass, temperature and gravity.

The program is written in Arm code and an interactive multi-tasking language has had to be developed to 'manage' the game.



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News in brief

Telemap which operates the Micronet database on Prestel hasn't made any impact on the Treasury which recently imposed VAT on the service. Despite a 3000 signature petition, the Treasury replied that information on electronic mail is taxable as its non-printed format puts it into a separate catagory from newspapers and magazines. Telemap is on (0442) 237237.

■ Promotion Information Systems has launched a range of re-usable labels, including one especially for 5.25 and 3.25 in discs. These include sections for title, disc number and date annotated with a special marker pen which can be wiped off. The *Maxi-Marker Superlabels* start at £2.50 for a pack of 10. Promotion Information Systems is on (0623) 647558.

■ The Pace Series Four range of Hayes compatible modems is being sold by Action Computer Supplies at prices below the recommended retail price. The top of the range 2400S V22bis modem costs £395 (RRP £509), while the 1200S V22 model sells at £326 (RRP £409). Action is on (0800) 333 333.

■ Quarcus Computer Systems has released a Risc OS compatible version of its *QCS Diary* at £14.95.

Wimp based and multitasking the package offers improvements over the Acorn Desktop Diary including three diary sizes, 15 lines of 40 characters plus a full-screen overview of a whole year. Quercus is on (0609) 70643.

■ Vertical applications for handling milk and newspaper deliveries have been developed by Dixon and Dixon farm management consultants.

Each package can handle 2000 customers and 200 stock items and can 'manage' 26 rounds. Dixon and Dixon is on (091) 2853 042.

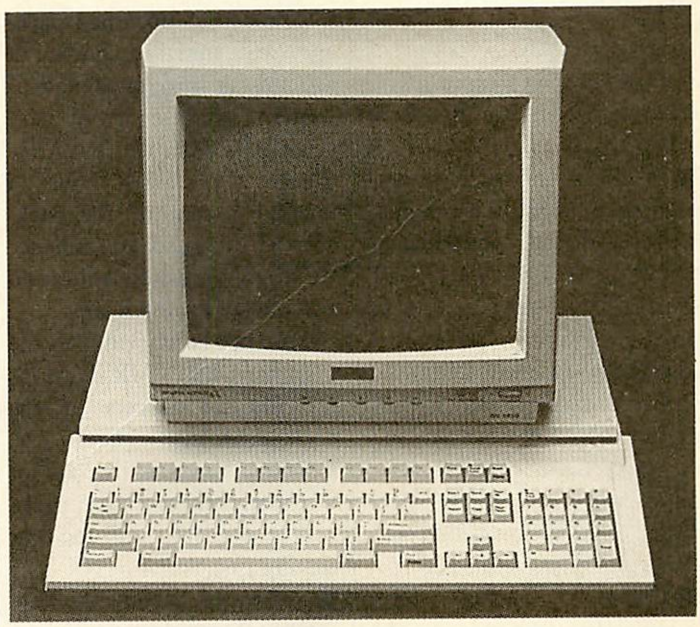
A3000 gets orders

Within one week of its launch, Acorn has received more than 3000 orders from distributors for the new A3000 machine.

Commenting on the orders, Acorn MD Harvey Coleman said the influx of orders so soon after the launch is very encouraging and firmly underlines dealers' confidence in the machine.

The orders for the machine were placed despite the fact the A3000 will not be available in high volume until the *BBC Acorn User* show when a number of companies including Acorn will be selling the machine for the first time.

■ Acorn has high hopes for the new machine's role in education and already one Local Education Authority has placed a major order for the A3000.

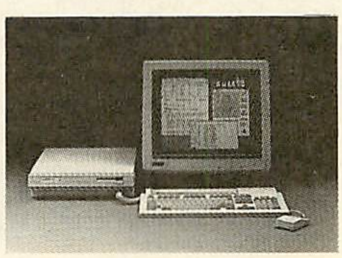


Durham LEA has ordered 500 machines. David Maddocks, IT and Business Studies said the order was placed to meet demand from TVEI secondary and special schools and that the authority will be introducing the A3000 into primary schools in the near future.

Acorn Unix puts on a good show

Acorn's R140 Unix workstation was well received at the three day Unix User show held in June. It was the first public showing of the R140 which in essence is a 4Mb Archimedes with 50Mb Winchester and Risc iX OS. At under £4000 for a complete system the R410 attracted a great deal of interest.

Software being demonstrated at the show included *Recital,* a dBase compatible relational database and *Q-Calc,* a Lotus, key-compatible spreadsheet. Catering for of-



fice automation, Acorn demonstrated *Q-office* and *Uniplex* which offer a range of tools including word processing, electronic mail, diary, notepad and memo facilities.

Announced at the show and to be made available later this year are the *Uniras* graphic programs which consist of 3D graphic libraries and toolkits.

■ Acorn also showed the SCSI and floating point coprocessor expansion cards for the R140 which are priced at £299 and £599 (plus VAT), respectively.

The SCSI Card gives user access to external peripherals such as optical discs and scanners, while the floating point unit replaces the built-in emulator on a R140 and on average provides an eight times increase in performance.

Acorn is on (0223) 245200.

News in brief

■ Education specialist Resource is currently developing a suite of software tools for the Arc. *Desktop Partners* will consist of seven units that make a database system.

The company also plans to release an Arc version of *Duft*, its graphics based mathematical adventure. Resource is on (0302) 340331.

■ Wild Vision has released a high speed eight-channel analogue to digital converter for the Arc. At £495 plus VAT the ADC 1208 is capable of up to 166,000 samples per second and 12 bit resolution.

The expansion card is programmable with software selection of input channel, sampling rate and digital I/O mode. Wild Vision is on (091) 2818481.

■ Colton Software has completely re-designed the *Pipedream* package for use under Risc OS.

Pipedream 3 conforms to the Risc OS guidelines and provides new features such as multiple document loading, 93,000 word spelling checker, slot projection and several new filetypes. The new version will be launched at the *BBC Acorn User* show where prices will be announced. Colton is on (0954) 211472.

Diary Dates

21-23 July. *BBC Acorn User Show*, Alexandra Palace, London. Tel: Safesel (0737) 814060.

11-12 September. *Econet '89*, Manchester Polytechnic. Tel: Acorn (0223) 245200.

18-19 September. *Educational Networks 89*, Newman College. Tel: LTS (0386) 792617.

4-6 October. *International Desktop Publishing Show/Presentations '89*, London Arena, Limeharbour, London E14. Tel: Database Exhibitions (0625) 879965.

Music upgrades

Electro Music Research is developing music/graphics application software for the Archimedes in conjunction with Minerva.

The as yet unnamed package will initially consist of around 15 programs and is written for use in primary schools. Described by Mike Beacher, of EMR as 'a musical adventure' the package is designed to enhance childrens' musical education and includes printed stories.

Minerva is working on the graphics while EMR develops the musical aspects of the package which should be launched towards the end of October. Various starter packs will be available with the first costing £69.

■ Acorn has become the first computer manufacturer to join the Music Industry Association. According to Ian Laurence, Marketing Director for Acorn, musicians are looking for powerful computers to explore new and exciting ways of making music, and the A3000 fits the bill.

Confident of the Arc's musical capabilities Acorn is exhibiting at the *British Music Fair* which is being held at Olympia from 25-30th July.

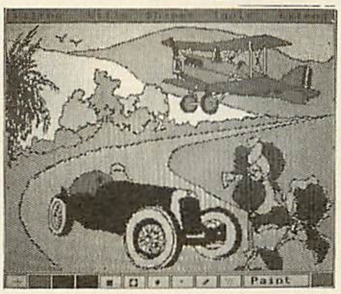
The A3000 will be on show together with three new MIDI products from Pandora. These include an event management program, a MIDI interface unit and a matrix manager which defines and monitors MIDI data paths.

Arc's will also be featured on the Roland, Casio and Technics stands. Acorn is on (0223) 245200.

Graphic upgrades

Nidd Valley has combined an enhanced version of its mouse operated *Colourbox* and *Illustrator* software into one disc based package which they will be demonstrating at the *BBC Acorn User* show this month.

Additions to the *Illustrator* part of the package include



nine font styles, 64 shading patterns and 16 brush styles. An optional disk at £5.75 offers a selection of pre-designed symbols for electronic and pneumatic circuit diagrams plus PCB artwork.

Colourbox enhancements include enlarge, reduce, flip, rotate and zoom functions. Print dumps for Epson compatibles, Intergrex Colourjet and the Star LC10 are also included.

Illustrator-colourbox is available for the BBC B, B+ and Master 128 for £60. A similar version is also available for the Master Compact at the same price. Nidd Valley is on (0423) 870145.

■ Ace Computing has released a Risc OS version of *Euclid*, the 3-D graphics package for the Archimedes.

The new version takes advantage of Risc OS and is multi-tasking and multi-editing. Drawings from the Draw application can be imported into the new version, extruded into three dimensions, saved as a sprite and imported into a DTP document.

Risc OS *Euclid* costs £70, or £25 as an upgrade. Ace Computing is on (0223) 322559.

BBC micro on safari

Acorn's BBC model B has been put through its paces by the popular youth organisation Operation Raleigh.

12 machines were donated to the organisation in 1984, and have been used on various expeditions to countries including Australia, New Zealand, Pakistan, Kameroon and central America.



On safari in Kenya the Beeb was used for report preparation, and statistics in a field laboratory where the micro was powered from 12V batteries and the monitor from a generator.

David Hopkins, Operation Raleigh's computer co-ordinator, says the micro's are extremely reliable. 'There are no worries about robustness, they just keep on working and give us so little trouble.'

Model B's will also be used in planed expiditions to Northern Queensland and Zimbabwe.

New 1770 DFS's

Newly formed Saturn Software has released two 1770 DFS's. v0.71 has all the features of Acorn's 1770 DFS v2.23, plus a number of added features including append, create, fdrive, print, remove and spoolon.

The second version (v0.91) is identical to the first but requires 16K of sideways Ram as it does not raise the value of PAGE. Both versions costs £16 and are available from Saturn Software, 59 Redesmere Drive, Alderley Edge, Cheshire, SK9 7UR.

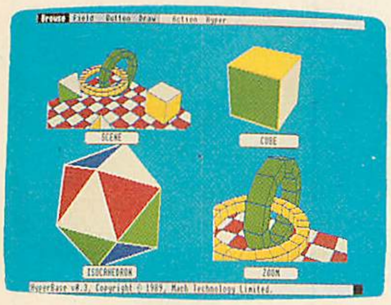
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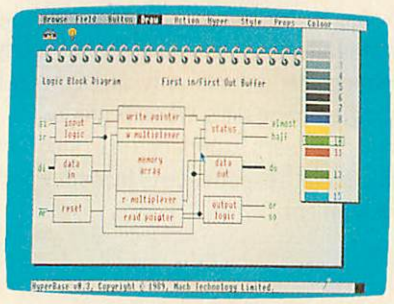
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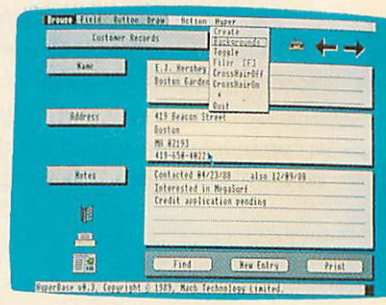
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Much ado about nothing



The popular press love to write horror stories about hackers and such like. It makes good copy and as the majority of readers know very little about computers in the first place there is a tendency to take what is written as absolute gospel.

The 'public reaction' serves as fuel for the fires that are kindled by the likes of MP Emma Nicholson who is campaigning for the obscenity laws to cover computer pornography. On the surface this sounds like a really good idea, but when it comes down to it, is it?

A few months back Jane Bird, Technology Editor for the *Sunday Times* wrote a feature on pornographic pictures which could be downloaded from various BB's by anyone who wanted to, including young children. Ms Bird failed to mention a couple of very relevant things.

The pictures available were for the PC and the vast majority are in high-resolution VGA format which requires an expensive adaptor card. I would imagine that the number of children who have access to a PC equipped with a VGA adaptor and a modem is small, to say the least.

However, the damage is done and the victims include anyone with a computer and modem. Already there is talk of making modems a licenseable item but I doubt if this will ever happen.

The popular press has blown computer pornography out of all proportions, and calm must be called for.

However, there is the other side of the coin. As featured in the news pages of *BAU* last month there are a number of BBs around the country with adult sections.

These sections contain explicit messages of a sexual nature, and the vetting procedures for accessing these areas are, in general, very lax.

A3000 – thumbs down

No doubt many of you will be considering the purchase of an A3000, not I. Being a comms enthusiast, the machines I use must be fit to do the job. My humble BBC model B has served me well over the years but even that is outdated in some respects.

I was shocked when the Arc was launched. Here was a machine with a terrible mode 7 emulation and no full RS232 port. Now we have the A3000 with the same drawbacks but no serial interface as standard. You have to plug in two chips to get things going.

I understand that Acorn has to cut corners in order to keep the price of the A3000 down but to miss out the serial chips but incorporate two tiny stereo speakers when the sound can be fed through a monitor or hi-fi is rather silly I would say.

EC2400 – thumbs up

I've been using a Hi-Tec EC2400 modem for a month and I have to confess that I like it a lot! At £279 (inc VAT) you get all the speeds up to 2400 baud, MNP level 4 error correction and MNP level 5 data compression.

The latter gives an effective data throughput of 4800 baud for text transfers.

CMD	DESCRIPTION / OPTION	CMD	DESCRIPTION / OPTION	CMD	DESCRIPTION / OPTION
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	DTE PARITY.....8NONE	&A	RESTRICT LSPEED..OFF	\N	MODEM MODE......NORM
	DIAL MODE......PULSE	&C	DCD OPT............0	\Q	LOCAL FLOW......BOTH
	LINE SPEED......NONE	&D	DTR OPT............0	\V	MODIFY RESULTS....ON
B	BELL MODE........OFF	&G	GUARD TONE.....ASYNC	\X	PASS XON/XOFF....OFF
E	CMD ECHO..........ON	&I	ADJ DTE BPS......OFF	S0	RINGS TO ANS.....000
F	LINE MODE.......AUTO	&L	LEASE LINE.......OFF	S2	<ESC> CHAR.......043
L	SPKR VOL.........MED	&M	ASYNC/SYNC.....ASYNC	S3	<CR> CHAR........013
M	SPKR CTL...........1	&O	S-REG FORMAT.....DEC	S4	<LF> CHAR........010
Q	QUIET............OFF	&S	DSR OPT............0	S5	<BS> CHAR........008
V	RESULT FORM.....LONG	&T	ENABLE RDL........ON	S8	PAUSE TIME.......002
X	EXT RESULTS........4	&X	SYNC CLOCK.......INT	S34	XON MARGIN.......000
%A	AUTO CHAR........000	\A	MAX BLK SIZE.....256	S35	XOFF MARGIN......000
%C	COMPRESSION.......ON	\C	AUTO BUFFER........3	S37	INACTIVITY TIME..000
%E	AUTO RETRAIN......ON	\G	REMOTE FLOW.......ON	S39	XON CHAR.........017
%Q	XON THRESH.......128	\K	BRK OPT............5	S40	XOFF CHAR........019

The long list of commands available on the EC2400 modem

Once connected to a suitable board the EC2400 'negotiates' with the host modem for a few seconds in order to determine if error and data compression can be used.

Accessing a BB at 2400 baud with the EC2400 is simply great. No more garbage on the screen due to line noise, and data scrolling so fast you have to save it to disc and view it later!

The EC2400 is an intelligent modem with its own microprocessor and battery backed Ram. The latter is used to store command strings and options, of which there are quite a few.

Without a doubt the EC2400 is one of the best modems to appear on the comms scene in a long time. Hi-Tec is on (0733) 52440.

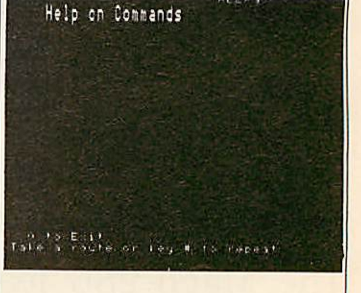
More gnome gnews

Things are hotting up on the Gnome at Home (01-888 8894, 1200/75 viewdata). Besides enhanced mail facilities highlighted in last months column, my spies reliably inform me of further news.

The advantages of on-line registration may be just around the corner if the Great Goblin can manage to get Access and Visa facilities.

Outgoing telex has been developed and outgoing fax facilities may soon be implemented as well.

To complement the large number of freebies which are already available, chargeable telesoftware may soon be introduced.



These snippets of information are fresh from the rumour department hence I couldn't get my hands on any specific dates or prices.

However, not rumour but fact is the G @ H's on-line help facility which is the best I've come across on any viewdata system.

Entering *HELP ?* will display a list of all the commands your privileges allow you to use.

Entering the route (number) next to the listed item will display a full summary of that particular command – isn't it simple!

David Janda

If you have any comms news please send it to David Janda at BBC Acorn User *or contact him on Telecom Gold 81:RED001 or via Prestel 942876210.*

EDUCATION

The rational path

BBC Soft is following the route of many other software houses which are dependent on a broader publishing operation to support them.

BBC Enterprises has decided the posts of the two main software editors, Ian Upton and Graham Bartram, will not be continued after their moves into other areas of the software world. This leaves BBC Soft with just two full-time staff – Alan Chapman, the software manager, and an assistant.

The official line is that BBC Enterprises is 'rationalising the operation' which then puts it in a position to 'act as an intermediary between broadcasters and software creators'.

This means all development work in future will be farmed out to other agencies or individuals. This in turn is likely to mean that software is created at arms length from the producers whose budgets finance the development. This may be an advantage in terms of educational credibility although it will generate major problems for Alan Chapman who will likely have to play ringmaster in this particular circus.

Despite these reasons for the reduction in staff however, it is easy to read between the lines – if only by looking at the examples of previous publishers cutting back staff. BBC Enterprises sees the educational software market as being in deep trouble. It has realised there are now dwindling funds in schools for software purchases with no further DTI schemes in the offing and so decided to take the route of 'rationalisation' – cut back jobs, farm out work and pay on royalties.

BBC Soft has just released *ArcComm* and *Kinship* and has a number of other projects on the stocks to support 'Look and Read', primary science and geography.



The Bug-e-Rom is for those computer users who are fed up with bug-free software. Do you long for those good old-fashioned error messages such as 'Inappropriate educational approach at line 90' or 'Non-contractual duty at line 3210 – not executed'? The Rom:

- **Causes *Podd* to utter naughty words and flash cyan/magenta**
- **Makes nettles grow in *Granny's Garden***
- **Dissolves *Flowers of Crystal***
- **Is actively hostile to other sideways Roms**
- **Produces 'No Room' error on BBC B+ or Master 128**
- **Withdraws goodwill during Teachers' Action**

If this appeals, you may have your free copy for only £53.99 (insurance and P&P) or so says the Special Needs Software Unit in Manchester where they are obviously not very busy!

Semerc's Blue File

The Special Education Microelectronics Resource Centre at Oldham has released a set of 'Blue File' software (freely copiable materials) as part of its brief from the National Council for Educational Technology (NCET). These packages were originally available through MEP but they may now be purchased from Northwest Semerc.

As an example, the excellent *Animals Pack* from Haringey is available for £6. Since this contains two discs, 18 pages of documentation, eight worksheets and 15 each of A3 and A4 Concept Keyboard overlays, there can be little profit in it.

For the catalogue of 20 programs contact Northwest Semerc, Fitton Hill CDC, Rosary Road, Oldham OL8 2QE Tel: 061-627 4469.

Semerc's rebirth

Still with Semercs, Bristol Semerc has been reincarnated by a consortium of 12 local authorities in the South-West and South Wales. It remains at the same address – Bristol Poly, Redland Hill, Bristol BS6 6UZ Tel: (0272) 733141.

The Newcastle Semerc has been partially relaunched at Resource in Doncaster where a substantial Special Education operation is named SENSU (Special Educational Needs Support Unit). Co-ordinator, Paul Meakin, may be contacted on (0302) 340331.

Teacher training?

News reached my ears recently of a course for practising teachers held in a well-known teacher training establishment. The course was intended to explore the integration of IT into science which, thought the delegates, would open up the possibilities that IT now has to offer the primary and secondary teacher.

Their optimism was dashed by presentations which recommended such golden oldies as *Factfile*, *Picfile* and *Ourfacts* as sensible data-handling systems and *Eureka* and *Raybox* as simulations.

No mention at all was made of control, sensing or monitoring and the overall impression given the delegates was one of stagnation. To make matters worse this institution was one which, in the heyday of MEP, was a leading light.

How are the requirements of the National Curriculum, particularly in Design and Technology, to be implemented if our initial teacher training establishments are still in the Dark Ages?

At the recent Buxton Conference on IT in the Secondary School, John Hammond from the Design and Technology Working Group posed the question 'How do we develop the IT capability of staff and encourage worthwhile use of IT across the curriculum?' Perhaps we've just found the best place to start!

Nick Evans

QUESTIONS AND ANSWERS

If you have a problem with an Acorn micro, commercial software or a program you are trying to write then *BBC Acorn User* can help. The Post A Problem service guarantees to give you a personal answer within 10 working days for just £4.

Write out your problem with as much detail as possible and, if a program is involved, include a disc or cassette. Fill in the coupon at the bottom of this page and send it and your problem along with a cheque or postal order for £4 (including VAT) made out to Redwood Publishing. If you want recorded delivery add on the cost of this.

Please note that debugging readers' own programs or those from other magazines is a complex task and we cannot guarantee to give a full solution. Unless the problem can be spotted quickly, the Post A Problem service will only be able to make general comments. The service will answer the problem and return all material received within 10 working days of receipt. If we fail to match this promise then your cheque or postal order will be returned – you can't lose!

BBC ACORN USER READER SERVICE
20-26 Brunswick Place, London N1 6DJ.

NAME ________________

ADDRESS ________________

POSTCODE ________________

DAYTIME PHONE NUMBER ________________

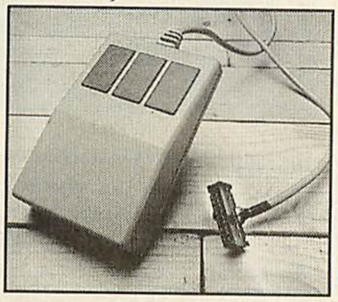
I enclose a cheque/postal order for £4 made out to Redwood Publishing and an sae with my problem.

OFFICE USE ONLY Date in:
Date out:
Answered by:

Q I use an AMX Mouse with both AMS *Stop Press* and *Super Art*. I have recently upgraded my BBC model B with 1770 DFS and ADFS to IBM compatibility by adding a 512 board and Watford co-processor.

I find changing back and forward from the AMX Mouse to the 512 Mouse to be very time consuming. Could I fit some sort of 'switch box' linked to the user port so that I could switch between the two mice?

A **A switch box is unncesary. Although the AMX mouse has more buttons, it is compatible with the 512 mouse.**



Q I have used a mouse extensively and now find the ball gets 'stuck' occasionally.

A **All you should need to do is to clean your mouse. Underneath the mouse you will find a plate that holds the mouse ball in place. Turn this and remove the ball. Clean the ball and the roller mechanisms with a 'cotton-wool bud' soaked in some alcohol or some other similar solvent that evaporates. If there are any particularly sticky lumps of dirt, remove them first with a penknife.**

Q I teach seven year olds in an Infant school. I am looking for a simple computer graphics program that would allow the children to experiment. Most of the available software is too complicated for them.

A ***Kiddie Art* (published in January 1987 *AU*) should suit your requirements. It is aimed at younger children, especially six to seven-year-olds.**

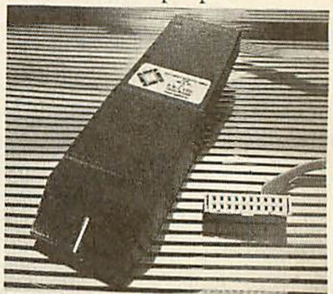
Q I own a Master 128 and I am considering purchasing the 512 upgrade board. What languages are there available?

A **C from Latice, Turbo Pascal from Borland, and Logo from De Base are all languages that have been successfully tested.**

The recently published *Dabs Press Master 512 User Guide* by Chris Snee lists a number of languages that run happily on the Master 512. These include DR Fortran, DR Pascal, and Microsoft Cobol.

Q I am in the process of setting up a business using a BBC Master 128 for stock control and invoice printing.

I would also like to consider using a bar code system for monitoring stock levels and sales trends. Do you know of any system that uses a BBC micro for this purpose.



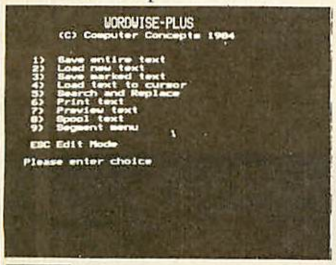
A **The Microelectronics Education Program did develop a bar code reader for the BBC micro. It was marketed by Addison-Wesley, and came with software to operate it.**

The bar code reader is still marketed and manufactured by PMF, PO Box 5, Romford, Essex. The latest version uses a Rom to hold the necessary software.

Q I cannot get my Taxan KP810 printer to work on my BBC Master 128. It still works perfectly on my old BBC model B. I have tried a new printer cable and have checked the connections.

A I think you have a configure problem. If *CONFIGURE PRINT is set to 0 then the output to the printer is ignored. Set the parameter to 1 for your printer (which is a parallel one).

Q I have recently upgraded from *View* to *Interword*. Is there a simple program or software to enable me to change *View* files into *Interword* compatible ones?



A To transfer *View* files to *Interword* you have to create an Ascii file that contains your text.

You should use the following:

```
LOAD <name of View file>
*SPOOL <name of Ascii file>
SCREEN
*SPOOL
```

then read the Ascii file you have created into *Interword* using 'Load text to cursor' which is menu option four.

Q I am using *Wordwise Plus* with a Star LC10 dot-matrix printer. I find if I am using different sizes of typeface for headings, especially if I am using a left margin or an indent, it is very difficult to maintain the correct horizontal spacing.

A Only issue a control code to alter the size of print directly before the word to be altered and change back to your standard size at the end of each line. In this way, by 'printing' the spaces which make up the left margin at the 'normal' size, the formatting will be maintained.

Q I have some 5.25in discs formatted in 40 track double density for use on an IBM PC with DOS 2.0/3.0. I want to use this data on my Archimedes 310 under Arthur or Risc OS.

I do not want to do the disc conversion myself. Can you recommend a company that specialises in this kind of task?

A AL Downloading Service of Voysey House, Barley Mow Passage, London, W4 4PT. Tel: 01-994 5741 provides a comprehensive disc transfer service. It charges £10 (plus VAT) per converted disc.

Q I have a Taxan Super vision 620 colour monitor (model 620B) which I have used with my BBC micro for a couple of years. I want to know whether I can use it with my Archimedes 310. If not, can it be upgraded?

A Unfortunately many existing BBC colour monitors will need modification to be used with an Archimedes.

A number of BBC magazines have given detailed advice about carrying out suitable conversion yourself. *BBC Acorn User* has not done this because of the safety aspects of the conversions. Do remember altering things inside any monitor can be dangerous and you should also have a certain degree of electrical knowledge before you attempt any electrical do it yourself.

You should contact Taxan (Tel: (0344) 484646). It may be prepared to do the work in its service centre or recommend an engineer.

ACORN CUSTOMER HOTLINE

Welcome to another Customer Hotline column. Since becoming Support Information Services Manager running SID (Acorn's Support Information database) Philip Colmer has lost contact with the mainstream activities of the Customer Support department and has asked me to take over this column.

My name is Peter Dunn and I'm a Software Support Specialist in the Customer Support department.

■ When running old-style applications such as Logistix under Risc OS, you will find that the amount of available memory for the application is controlled by the Next slot under the Task Manager. If you increase the size of the Next slot by dragging it to the right before running such applications, you will find that the application has more memory to use.

Note that this does not apply to the PC Emulator which has a new boot sequence on the Support disc.

■ This month's application notes cover the *View* word processor package. The first application note contains information on how to use extended highlights with *View* and additional information on page layouts. The second application note is a program which will allow you to print labels from a *View* macro file.

The demand for application notes has been very good over the last few months and people are finding them interesting. However, when writing in for the application notes please enclose an A4 SAE. This will ensure our response time for sending the application notes out is quicker.

■ We are commonly asked how to get colour output from the video out ports of both the Master 128 and BBC model B and B+. On the BBC model B make the following modification to the circuit board.

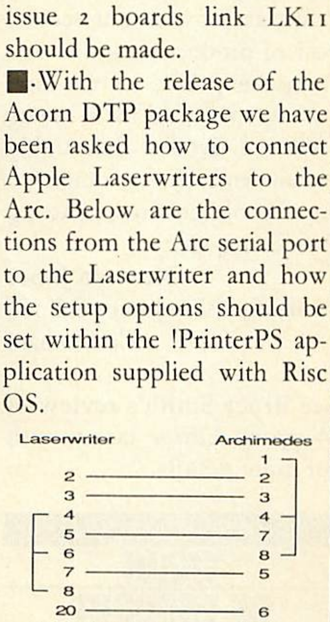
On issue 1, 2 and 3 board a 470 picofarad capacitor should be fitted between the emitter of Q9 (identified by an e next to one leg) and the base of Q7 (the central leg).

On issue 4 and later, the capacitor is on-board and can be connected simply by fitting link 39 which may be found next to the modulator in the far right hand corner of the PCB. On the BBC model B+ link S26 should be made.

On Master 128 issue 1 boards a capacitor should be connected between the East leg o R137 and the east leg of R153 which are located to the east of the modulator.

Connections should be made on the component side of the PCB with the leads of the capacitor being soldered directly to the leads of the two resistors. On Master 128 issue 2 boards link LK11 should be made.

■ With the release of the Acorn DTP package we have been asked how to connect Apple Laserwriters to the Arc. Below are the connections from the Arc serial port to the Laserwriter and how the setup options should be set within the !PrinterPS application supplied with Risc OS.



Laserwriter baud rate : 9600

Data Format

Bits	: 8
Parity	: Off
Stop Bits	: 2
XON/XOFF	: selected

LETTERS

BBC Acorn User, 20-26 Brunswick Place, London N1 6DJ. BTG/TTNS 81:RED001

WONDERFUL WAPPING


The Benfieldside Junior School
Issue 8 BOOKWORM March '88 8pence
PLAYGROUND CHANGES
Survey Results
Hired Yards
Trial Period
TRAVELWISE of CONSETT

I am sending you a copy of our school newspaper that is prepared using *Typesetter* from Sherston Software and *Wapping Editor* from Watford Electronics.

I have found *Wapping Editor* extremely simple and quick to use. The children create their own graphics, complete with titles, after only a couple of minutes instruction.

We are now in our second year of production and it was from the profits of the first year that has paid for *Wapping Editor*. I would thoroughly recommend this package to any school thinking of starting their own paper.

Norman Jones
Benfieldside Junior School,
Co Durham

See Bruce Smith's review of *Wapping Editor* last month for more details.

TRAIN OF THOUGHT

I am a fan of model railways as well as computing. Two of my friends and I have just completed an OO gauge model railway, and I was wondering if it would be possible to control it via my BBC micro. What we need is something to change points, signals and so forth.

David Thomson
Lenzie

Two books you will find worth reading are *Electronic Circuits for the Computer Control of Model Railways,* R A Penfold (Babani) and *Computer Projects for Railway Modellers,* Roger Amos and Martin Cock (Patrick Stephens).

ART FOR ART'S SAKE

I recently purchased the *Proartisan* graphics package from Clares as I am interested



in art and graphic design. I have produced several pictures and was wondering if *BBC Acorn User* would be interested in publishing any of them.

Michael Setek
Ashford

We are always keen to receive pictures drawn using any of the Acorn range of machines. Our *Artisan* competition last spring proved very popular so there must be some more budding artists out there. If there is enough response, there could be the possibility of a 'Gallery' page in future issues of *BAU*.

OFF AIR SOLUTIONS

I am a specialist in the cable TV systems business in Belgium and own a BBC model B, Archimedes 310 and a teletext decoder. I would like to confirm the following.

BBC1 and BBC2 are all on greater cable TV in Belgium. The operators do not strip off the teletext signals. Almost all BBC programmes are carried on the VHF band and teletext decoders from England are only suitable for UHF.

Possible solutions are:

1) Changing the teletext decoder to the output of a video recorder but most video recorders disturb the teletext signal and the video recorder often disconnects automatically when not in use.
2) Changing the UHF tuner by a combined VHF-UHF (Morley has done this to my decoder and delivered special software).
3) Connect the teletext decoder to a 'Filmnet' decoder. One of the presets has to be tuned (eg. to the BBC2 programme). At the output of the Filmnet decoder the signal is in UHF, and a standard teletext decoder can be used.
4) Connect the teletext decoder to a VHF/UHF channel converter (Siemens and other cable television manufacturers sell such material) converting the cable signal to a UHF-channel.

This information can also be used by persons living in Britain who are connected to VHF and VHF-UHF cable networks.

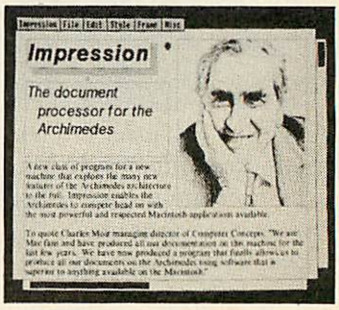
H Stevens
Brusselseheerweg

BETTER BY DTP

I have bought an A310, having upgraded from a BBC B with a mouse. I've used *SuperArt* and *Stop Press* and wondered if AMS is planning an Arc version.

I currently use Clares' *Artisan* and Computer Concepts' *Interword* on my Arc but find them limiting for the work I do – music fanzines. Up till now, my BBC has been ample but the fanzines are increasing in size and the Arc seems a perfect choice.

Tony Stilling
Bolton



There are no plans for AMS to release Arc versions of its software. AMS has in fact pulled out of the Acorn market and it is unlikely that any of its software will ever see the light of day on the Arc.

There are two products (both will be featured at the *BBC Acorn User* Show this month) which might help. *Acorn Desktop Publisher*, is a specially written version of *Timeworks* for the Arc. This is a full-feature DTP package designed to work under the new Risc OS environment. The other – *Impression* – is described as a 'document processor' and allows text and graphics to be easily mixed.

FREE 8 PAGE CATALOGUE

Send a stamped addressed envelope for your copy

FREE HELPSHEETS/MAPS

Spend over £4 on games and you may choose **ONE** of the following helpsheets/solutions and maps absolutely **FREE**.
Spend over £10 and you may choose any **TWO FREE** :-

Pipeline................(Helpsheet + 4 maps)
Village of Lost Souls..........(Helpsheets)
Impact Jokes....................(Lots of jokes)
Impact Jokes 2..........(Lots more jokes)
Shark...(map)
Spycat.......................(Solution + map)
Plan B........................(Solution + map)
Zarch.................................(Helpsheet)
Stryker's Run.....................(Electron map)
Ziggy......................(Solution + maps)
Future Shock...............(Solution + map)
Airwolf.......................(Solution + map)
Return of R2.........................(Map + tips)
Bug Eyes 2 ....(Map)
Myorem.......................................(Solution)
The Lost Crystal........(Solution + maps)
Imogen...................(Solution + 16 maps)
Quest.........................(Solution + map)
Ravenskull..............(Solution + 4 maps)
Last of the Free.........(Solution + map)
Starditter...................(Helpsheet + map)
Corruption..................................(Solution)
Golden Figurine..........(Solution + maps)
Enthar 7...(Solution)
Exile...(Helpsheet)
Terramex.......................................(Solution)
The Hobbit......................................(Solution)
Citadel..................................(Solution + map)
Plan B2...............................(Solution + map)
Spy Vs Spy..................................(Helpsheet)
Spellbinder.........................(Solution + maps)
Elixir.................................(Solution + maps)
Paperboy.......................................(Helpsheet)
Twin Kingdom Valley.........(Solution + map)
Omega Orb..........................(Solution + map)
Elite.......................................(Helpsheet + tips)
Tarzan.................................(Solution + map)
Stranded...(Solution)
Codename : Droid...............(Solution + map)
Thunderstruck.......................(Solution + map)
Suds..(Solution)
Philosopher's Quest...........(Solution + map)
Rick Hanson...................................(Solution)
Thrust..(Maps)
Last Ninja.........................(Solution + maps)
Exile..............................(Helpsheet - Part 2)
Hoverbod......................(Passwords + cheats)
Frak!...(Helpsheet)
Thunderstruck 2....................(Solution + map)
Kourtyard............................(Helpsheet + map)
Dunjunz.........................(Helpsheet + 25 maps)
Gisburnes Castle...................(Solution + map)
Palace of Magic.....................(Solution + map)
Impact.......................(Helpsheets + passwords)
Icarus.................................(Helpsheet + maps)
Sphinx Adventure..................(Solution + map)
Anarchy Zone.........(Helpsheet + passwords)
Repton 2.........................(Helpsheet + 18 maps)
Bonecruncher...............(All passwords + maps)
Skirmish...(Helpsheet)
Cholo...(Solution)
Quest for Freedom...............(Solution + map)
Kayleth..(Solution)
Starquake.......................................(Helpsheet)
Rick Hanson 2.................................(Solution)
The Hunt..(Solution)
Sabre Wulf..........................(Helpsheet + map)

WHITE MAGIC (The Fourth Dimension)

Following the immense success of Holed Out, The Fourth Dimension have now released a unique new fast-action arcade adventure called WHITE MAGIC. You can at any time transform into a Leprechaun, Enchanter, Titan or Warrior in order to use their much needed varied abilities. A sure-fire hit. For more details ring the Impact Newsline.

BBC/Electron Cassette £9.95 BBC B/Master 5 1/4" Disc £12.95
Enhanced Archimedes version available mid July at £19.95

ARCHIMEDES GAMES

White Magic (The 4th Dimension)	*19.95*
Holed Out (3D Golf) (The 4th Dimension)	*19.95*
Holed Out Extra Courses Vol 1	*16.95*
Holed Out Extra Courses Vol 2	*16.95*
Cheat It Again, Archie (Impact Software)	*9.95*
Quazer (Impact Software)	*9.95*
Startrader (Gem)	*16.95*
Word Up & Word Down (Gem)	*16.95*
Pacmania (Grandslam)	*15.95*
Repton 3 (Superior)	*15.45*
Jet Fighter (Minerva)	*11.95*
Corruption (Rainbird)	*19.95*
Fish (Rainbird)	*19.95*
Fireball (Godax)	*15.95*
Orion (Minerva)	*11.95*
3D Pool (Firebird)	*16.95*
Freddy's Folly (Minerva)	*11.95*
Alerion (Dabs Press)	*12.95*
Terramex (Grandslam)	*15.95*
Zarch (Superior)	*15.45*
Hoverbod (Minerva)	*11.95*
Missile Control (Minerva)	*11.95*
Thundermonk (Minerva)	*11.95*
Minotaur (Minerva)	*11.95*

HOLED OUT EXTRA COURSES

Due to overwhelming public demand The 4th Dimension has now produced 2 volumes of extra courses for their superb 3D golf game Holed Out. Each volume contains 2 brand new courses plus the original Holed Out program; therefore you do not need the original Holed Out in order to play them.

"I wouldn't have thought it possible to get a better simulation out of the beeb." *BBC Acorn User, June 1989.*
"The 3D perspective graphics are stunning" *Electron User GOLDEN GAME June '89*
"Holed Out is great.....The game plays very well and the graphics are superb." *Popular Computing Weekly, March 1989*
"The best golf simulation I've ever seen on any Acorn machine." *The Micro User, June 1989*
"The Electron version is brilliant - it's almost the same as playing at Gleneagles. Unreservedly recommended."
A & B Computing Game of the Month, June 1989

Prices above and opposite

TITLE & PUBLISHER (M = Master Compatible)	BBC or Electron Cassette	BBC 5 1/4" Disc	Master Compact 3 1/2" Disc
IMPACT SOFTWARE (Discs are BBC B & Master Compatible 40/80)			
The Art Studio M	9.95	12.95	14.95
Orbital M	4.95	5.95	6.95
Clogger M	4.95	4.99	6.95
Zenon M	4.95	4.99	6.95
Cheat It Again, Joe 1	2.99	4.99	-
Cheat It Again, Joe 2	2.99	4.99	-
Cheat It Again, Joe 3	2.99	4.99	-
THE FOURTH DIMENSION			
Holed Out (3D Golf) M	9.95	11.95	12.95
Holed Out Extra Courses Vol 1 M	9.95	11.95	12.95
Holed Out Extra Courses Vol 2 M	9.95	11.95	12.95
White Magic M	9.95	12.95	13.95
Arcade Soccer M	9.95	12.95	13.95
SUPERIOR			
Play It Again Sam 8 M	6.90	-	-
Question of Sport M	9.50	11.50	15.70
Play It Again Sam 6 M	6.90	-	-
Last Ninja M (BBC Only)	6.90	-	11.25
Repton Infinity M	9.45	-	15.75
Play It Again Sam 5 M (BBC Only)	7.25	-	11.50
Exile M	9.45	11.45	15.75
By Fair Means or Foul M	6.90	8.90	11.25
Play It Again Sam 4 M	7.25	9.50	11.50
Play It Again Sam 3 M	6.90	8.90	11.25
Pipeline M	6.90	8.90	11.25
Repton Thru Time M	5.50	6.50	7.50
Barbarian M	6.90	8.90	11.25
Play It Again Sam 2 M	-	-	11.25
Bonecruncher M	6.90	-	11.25
The Life of Repton M	5.50	-	7.50
Elixir M	6.90	-	9.95
Repton Around the World M	5.50	6.50	7.50
Quest M	6.90	-	-
Elite M	9.45	11.45	15.75
Acornsoft Hits 1 M (BBC Only)	3.99	-	11.50
Acornsoft Hits 2 M	2.99	-	11.50
TYNESOFT			
Superman M	6.90	10.95	-
Circus Games M	6.90	10.95	-
Summer Olympiad M	6.90	11.25	11.25
Saigon M	7.25	-	-
Winter Olympiad '88 M	6.90	8.90	11.25
Spy vs Spy M	7.25	-	-
Indoor Sports M	7.50	11.95	-
Future Shock M	7.50	11.95	11.95
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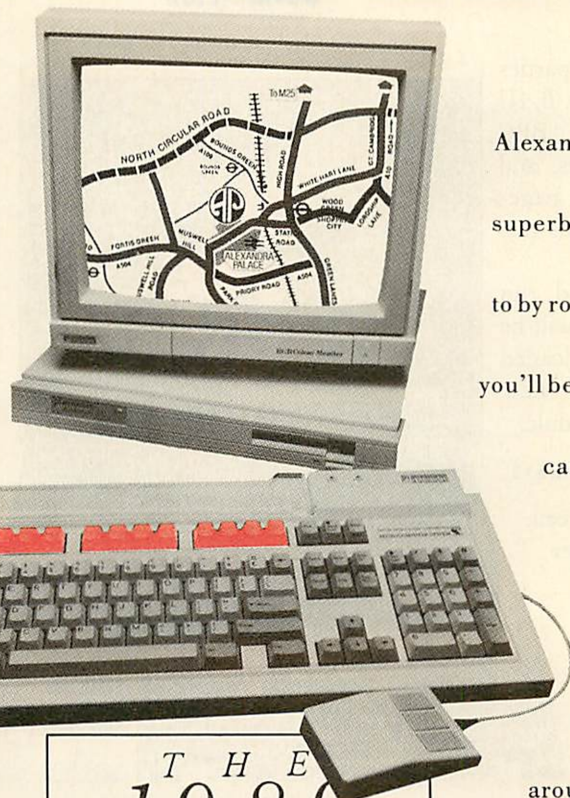
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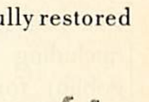
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ARC AGORA

SCREEN PLAY

Putting your favourite BBC screens on the Arc, more about prime numbers, and a look at the Risc OS applications

David Acton

I've had requests from various parties (including Mobrilla – the chief *BAU* goblin) for a utility to display BBC graphic screens on an Archimedes, and vice versa. Listing 1 on the yellow pages assembles a module which performs this very task.

To use the module, enter and run listing 1. If all is well the module will be saved as 'ConvMod' and can be loaded with *RMLOAD ConvMod. Two new commands are provided by this module:

```
*LoadBBCScreen <filename> [<mode>]
```

This attempts to display a BBC screen. If you specify a mode number after the filename, this will be selected prior to loading.

In all, five modes are supported – 0,1,2,4 and 5. These are the only graphics modes available on the BBC and to save a screen on the Beeb (or Master) you should use either *SAVE <filename> 3000 8000 for a 20K mode (that is mode 0,1 or 2) or *SAVE <filename> 5800 8000 for a 10K mode (4 or 5). Shadow memory and second processors complicate the issue somewhat, so refer to other articles and texts if you are unsure.

```
*SaveBBCScreen <filename>
```

This command saves the current Archimedes display as a BBC screen file. Note the Archimedes should be in mode 0,1,2,4 or 5 and an error will be reported otherwise.

Screens saved in this way can be shown on a BBC with a simple *LOAD <filename> as the load address is set to &3000 or &5800 accordingly. Obviously you will need to select the correct mode beforehand – the screen file contains only the graphics data and no information about the screen mode, palette or anything else.



Putting BBC graphics on the screen of your Arc – easy

To try out the module, enter and run listing 2 either on a BBC or Master. This program will save five suitable BBC format screens on your disc. You will then be able to run listing 3 on the Archimedes which will attempt to display them.

I used a Master Compact when developing the module and so it was easy to transfer files between it and the Archimedes. If you cannot use the same disc on your Archimedes and BBC or Master then you will need to use some sort of file transfer package (or the Econet if you have one) to copy the screens from one machine to the other.

We hope to be covering the thorny problem of Beeb-to-Arc file transfer in a forthcoming Agora.

There are essentially four differences between the ways in which Archimedes and BBC micros display pictures. First, BBC display modes are 'character based'. That is, consecutive bytes of screen memory are arranged into groups of eight. For example, figure 1 shows how a mode 0 screen is arranged. This is to allow the speedy display of text characters which are eight pixels high.

Archimedes screen modes are arranged in a more straightforward manner – consecutive bytes run from left to right and then proceed to the next pixel line. Mode 0 on the Archimedes is shown in figure 2.

Another major difference is apparent with regard to colour. In mode 1 for example, there are four colours available, so each screen byte represents four pixels (two bits for each dot). These two bits are next to each other on an Archimedes display but on a BBC micro they are four bits apart. So to convert from one to the other you must shuffle the bits.

More bit shuffling is needed to overcome the third difference. This is simply that the order of the bits runs the opposite way on an Arc to a Beeb. So, to put a dot in the top left-hand corner of a mode 0 screen you would use something like ?&3000=128 on a Beeb and something like ?&1FD8000=1 on an Arc. The screen base address does vary on an Arc, as it does on a Beeb but it will always be ludicrously huge.

The final difference is perhaps the most obscure. There are no 10K modes on an Archimedes, only 20K or more. This means mode 4 is in fact identical in memory terms to mode 0. All that happens is that pixels are duplicated horizontally. Similarly, mode 5 is just

mode 1 in disguise. Mode 2 is also not as it first appears to be. In fact it's a 40K mode on the Archimedes and is just mode 9 with horizontal pixel duplication. What a schemozzle as they say in these parts.

The process of conversion is done in two parts. First, conversion tables (each 256 bytes long) are used to perform the various bit-shuffling exercises.

Only three tables are needed – one for modes 0 and 4, one for modes 1 and 5, and one for mode 2. Three further tables are used to perform the reverse operations when saving a screen in the BBC format.

byte 0	byte 8	byte 16
byte 1	byte 9	.
byte 2	byte 10	.
.	.	.
.	.	
byte 7	byte 15	
byte 640	byte 648	
byte 641	.	
.	.	
.	.	
byte 647		

Figure 1. BBC mode 0 screen arrangement

byte 0	byte 1	byte 2 ...
byte 80	byte 81	byte 82 ...
.		
.		
byte 560	byte 561	byte 562...
byte 640	byte 641	byte 642...

Figure 2. Arc mode 0 screen arrangement

However the duplication of pixels is treated separately and consists of a pair of nested loops which simply shuffles pixels out of the source byte and into the destination bytes, duplicating them in the process.

The module header is standard and should be quite familiar by now. The two star commands supported are handled by .lbs and .sbs.

The routine .lbs functions as follows. First, the filename is extracted by .getname and the mode number (if specified) is checked. The appropriate mode is selected if necessary using VDU 22,n. Incidentally, you might like to include a SWI "OS_RemoveCursors" immediately before .nomodespecified. You might also consider switching the cursor off with OFF prior to saving a BBC format screen. Otherwise there's a good chance the cursor will be frozen into your picture.

The main loop simply gets bytes from the open file and 'blats' them onto the screen. The register 'double' contains 1 if horizontal duplication is required and 0 if not. Duplication and other information about the particular mode being used is read from the table .modeinfo. The process of duplication is performed by the subroutine .stretchit. This uses values from .modeinfo to shift the bytes about in a way appropriate to the number of colours available in that mode.

The .sbs routine performs in literally the opposite way to .lbs. Similarly, the subroutine .squashit performs the reverse function of .stretchit.

The conversion tables are built by PROCmaketable. For speed and succinctness, the 'inverse' tables for *SaveBBCScreen are built up at the same time as those for *LoadBBCScreen.

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PRIME TIME

Our mathematical diversion this month comes from regular Jason O'Broin. It's a version of that old chestnut, the prime-number generator, but written in Arm code so it whizzes along. A table is built up of all the prime numbers encountered. Then, each subsequent number is divided by the known primes to see if it too is prime. If so, the number is added to the list, if not, the next is checked.

Numbers are displayed using SWI "XOS_BinaryToDecimal" to convert a value to a string and SWI "XOS_WriteN" to show that string. The checking is performed by addition, which is speedy for small primes but slower when checking for larger ones.

Jason's program displays all the primes from 1-10000 in about 36 seconds. If you can do it faster then send in your program and show us how it's done . . .

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APPLICATION EXPLANATIONS

Risc OS owners will be aware that the applications supplied come in the form of directories (!PAINT, !MAESTRO, etc) and are selected by double-clicking on the directory name. This system works because each application is written according to some basic Risc OS rules.

Inside a '!' directory you'll find a collection of files. Many of these are common to all applications, so here's a summary of the important ones.

!Boot is a file which is executed when the parent directory (usually $) is first catalogued. !Boot is usually of type 'obey'. Not all applications have this file but it has two important uses. First, special application sprites may be loaded into the 'common sprite pool' using the command *IconSprites. Secondly, 'aliases' may be set up for a particular file type so that clicking on such a file will cause the application to be run.

For example, the !Paint application does both these things so that Paint files are displayed beside the special Paint icon and clicking on a Paint file causes !Paint to be installed automatically.

!RUN is the file executed when the directory is double-clicked. In its simplest form it will merely run your application program but often !Run will do three other things.

First, a system variable is set up with the full pathname of the application directory. This enables your application to function correctly, irrespective of where you place it in the directory tree.

Secondly, modules needed by your application can be loaded (if necessary) using *RMEnsure. This command takes two parameters – a module name and a place where this module may be found if not already installed.

Thirdly, a check can be made to see if there is enough space for your application. This is done using *WimpSlot. For example, if you need at least 128K you would include *WimpSlot -min 128K in the !Run file and this would generate an error if there were insufficient memory.

!Sprites contains the special sprites peculiar to your application. As a rule there are two – one with the name of your application and another with the same name prefixed with 'sm'. These are the large and small sprites displayed beside filenames in directory windows and the large sprite is also used on the icon bar if appropriate to your application (although you must take the responsibility of putting it there in your own code).

*RunImage is the standard name for the application program itself. To acquaint yourself with the rules for applications, have a look inside the directories supplied on the Welcome discs.

Send your programs, ideas, hints and tips to: Arc Agora, BBC Acorn User, *Redwood Publishing, 20-26 Brunswick Place, London N1 6DJ. Up to £20 and simply oodles of esteem shall be bestowed upon the chosen few.*

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A3000

The world's most powerful home micro looks set to steal the show

Rob Miller

There are now seven members of the BBC micro family. The idea, first started seven years ago as an 8-bit machine with 32K of Ram, has now evolved into an immensely powerful 32-bit 'super' micro. The new A3000 is the latest micro in the range and has replaced the 300 series Archimedes as the home computer to have.

The first worry people have when buying a new micro is whether the 'teething' bugs inherent in all machines have been ironed out. With the A3000 there is no need for concern as it follows closely in the footsteps of the Arc 310 and so has already had two years 'running in'.

Availability of software is always the other major 'con' but this is no problem as software written for the Arc will run just as well on the new machine.

For those new to Archimedes, a few points should clarify what makes the A3000 stand out. The two obvious 'rivals' are the Atari ST and the Commodore Amiga. Both these machines are based around 16-bit architecture and come with 512K of Ram as standard.

The A3000 uses the Acorn designed 32-bit Risc processor and qualifies as a true 32-bit micro. The standard 'base' machine comes with 1024K (1Mb) which can be upgraded to 2Mb if required.

Much has been written about the Acorn Risc chip, most of all its phenomenal speed. A look at the benchmarks make it clear exactly what difference the new processor makes.

The original Archimedes was hailed as 'the fastest home micro in the world'. With a revised board design, the A3000 is faster still.

What do you get?

The A3000 comes as one unit. Keyboard, circuit board, disc drive and power supply are all contained within the same BBC cream-coloured case.

Sound on the A3000 consists of eight stereo channels and, for the first time, there are two speakers, one mounted at each end of the keyboard.

Sound can also be played through an external stereo amplifier via a mini-jack on the back of the machine.

Unlike the original Beeb, there are only a couple of outputs available. Parallel and serial sockets are provided, although an extra chip must be fitted if you wish to use the serial port. A user port, analogue port and 1Mhz bus can be added by fitting the necessary 'mini' podule (peripheral module) expansion card. The first podule likely to be made is a combined user port/MIDI port.

Only one podule can be fitted internally although more can be added through an external expansion port. Pres, the company which made the most of the Electron related add-ons, is to make an expansion box that will bolt-on to the back of the A3000 to provide the extra space.

Existing podules on the Arc are likely to be redesigned to work in the A3000.

As well as the computer, a mouse, two manuals and two utility discs are included in the package.

The mouse is a three-button unit that plugs into the computer, underneath the left-hand side of the keyboard. It is quite fiddly to plug in the mouse (much like the Atari ST) but once fitted, it remains sturdy and secure. It is a strange choice to have the mouse on the left, but the cable is long enough to use it with your right hand. In use, the mouse works well on virtually any clean surface.

The manuals supplied with the machine are the result of (at last) some clear thinking. Where in the past a computer manual often had the information you needed, it was always impossible to find due to it being buried in seemingly meaningless jargon.

The new books are really a million miles away from this. They are clear, well laid out and have useful diagrams and pictures to help clarify difficult concepts.

Once a few simple rules and ideas have been mastered, the user is able to actually use his or her new micro immediately. Although it is a very powerful machine, the A3000 has been designed primarily with simplicity and ease-of-use for the average owner in mind.

In the past, BBC machines have been supplied with utility discs containing the bare essentials – disc formatter, verifiers and so on. The two 'Applications' discs supplied with the A3000 represent as much a leap from the 'old' utility disc as the A3000 is from the original model B.

Virtually everything that was included on the old style discs (bar the obligatory game!) is now included in the A3000's Rom, so Acorn has come up with some completely 'bundled' software. This is of professional quality and could easily have been sold separately at full price.

There are two discs containing a suite of three applications – *ArcDraw*, *ArcEdit* and *ArcPaint*, plus a selection of other 'desktop tools' such as a clock and calculator.

One of the main features of Risc OS (the operating system used in the A3000), is its desktop. From this, programs can be run by pointing at icons along the bottom with a small arrow (pointer) and pressing a button on a mouse. When run, a window is selected for the program to work in.

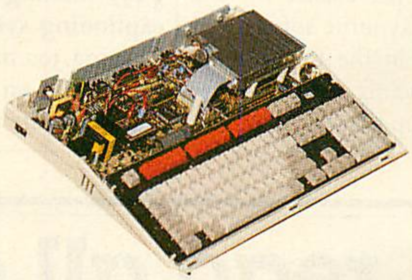
Several windows can be 'open' at once and can even overlap if the desktop is getting full. Other operations (such as cataloguing discs) can also be carried out in the 'desktop environment'. People who have used 16-bit micros such as the Atari ST, Amiga and the Macintosh will already be familiar with this simple way of operating a micro.

Virtually all of the programs supplied with the A3000, and others purchased from other companies, are designed to be used on the desktop.

The three main 'Arc' applications included are designed to be used together, in some cases at the same time. One of the most exciting aspects of Risc OS is its ability to 'multi-task' – it can run two or more programs simultaneously. *ArcDraw*, *ArcEdit* and *ArcPaint* will run (given enough memory) side by side. Even on the unexpanded A3000 you can have any two running together.

Machine	Price (ex. VAT)	RAM	Extra for 1 Mb	Graphics	Sound	Software incl.
BBC A3000	£649	1 Mb	n/a	640 x 512 256 cols	8 chnl. stereo	Full WIMP OS in ROM. ArcDraw, ArcEdit, ArcPaint. BBC Emulator, Desktop tools.
Atari 1040 ST	£434	1 Mb	n/a	320 x 200 16 cols	4 chnl. mono	Microsoft Write Superbase Personal VIP
Commodore Amiga 500	£319	512 K	£130	640 x 512 32 cols	4 chnl. stereo	None

Benchmark	BBC A3000		Arc 310	Atari 1040 ST	Commodore Amiga 500
	Basic 5 Ram	Basic 5 Rom	Basic 5 Rom	FastBASIC	Amiga Basic
intmath	0.18	0.15	0.35	1.25	1.7
realmath	0.25	0.21	0.38	1.63	2.7
triglog	1.07	0.8	1.41	6.38	6.7
textscrn	2.81	2.73	4.4	88.16	150.3
grafscrn	1.55	1.41	6.9	35.67	25.0
store	3.17	3.16	6.5	56.57	32.7
average	1.51	1.41	3.32	31.61	36.52



The applications

Briefly, *ArcDraw* is an 'object orientated' drawing program that allows individual shapes, lines and curves to be edited without affecting other objects.

Text and sprites can be imported directly from *ArcEdit* and *ArcPaint* respectively. Transferring data is just a matter of pointing at one window (either *ArcEdit* or *ArcPaint*) and dragging the contents to the other (*ArcDraw*). Printout on dot-matrix and laser (Postscript) printers is catered for by the two printer drivers supplied.

ArcEdit allows the editing of raw text and is ideal for writing programs to be compiled in languages other than Basic.

ArcPaint is a sprite designing package that compares favourably with full price art programs available for the Archimedes and the ST and Amiga.

The remainder of the software consists of several useful tools such as an alarm clock and calculator. For those who wish to use their old BBC software, an extremely versatile emulator 'converts' the Arc into a model B, running OS 1.2 and Basic 2. Like the PC emulator (available separately), it is a case of what software won't run rather than which programs will. A lot of the games written for the original Beeb will run, although a little slow. Educational users will find the emulator a real boon, especially used in conjunction with the user port podule.

There is no need to throw out your old software, even though you've changed machines.

All in all

There is no doubt the A3000 is an enormously capable machine. The rival machines really in its league are the latest IBM PS/2 PCs with VGA graphics or the most powerful Macintosh. However, such machines cost thousands, not hundreds of pounds.

So, inevitably, the A3000 will be compared to the ST and Amiga – the home micros in the same sort of price range. It is more expensive than these rivals (though, in real terms only as expensive as was the first BBC micro in its day) but it offers a package far in advance of anything from either Atari or Commodore.

The A3000 is faster than any other micro. It has graphics capabilities suitable for professional video work and can produce sounds not out of place in a recording studio. There is little it cannot do. It is not so much a question of: why does the A3000 cost more than the ST and Amiga? but: how can such a powerful machine cost so little?

Better by BAU

Make sure you don't miss a visit to the *BBC Acorn User* stand. There, the team behind your favourite mag will be on hand to answer any technical questions on the range of Acorn computers and on programs and features published in *BAU*. We are also there to give advice on the best products to buy based on the unbeatable *BAU* knowledge of the market.

Such famous names as Dave Acton, Dave Futcher, Dave Janda, Dave Laurence, and even some *BAU* authors not called Dave, such as Rob Miller, Richard Browning and Geoff Bains will be there to impart their pearls of wisdom on all matters about Acorn.

Subscriptions, monthly discs, compilation discs, special offers and even T-shirts will be on sale to the discerning reader and you will have the golden opportunity to try before you buy.

If you have recently completed a masterpiece of prose or programming suitable for inclusion in *BAU*, the show is the ideal opportunity to talk it over with the editorial staff and deliver the disc safely into their hands.

Later this year *BBC Acorn User* magazine will be presenting awards to the software and hardware producers most worthy of note in 1989. On the *BAU* stand you will also have the first chance to vote for your favourite software or hardware in the forthcoming *BAU* Awards – make sure you pick up a ballot paper.

Double up your Master

Slogger, better known for Electron add-ons, is launching an 'astounding breakthrough in software technology' for the Master 128 at the show.

The *Click* Rom cartridge has its own 64K Ram and 128K Rom operating in parallel with the Master's own memory to provide the facility to jump out of any software running on the micro, perform a number of functions and then jump back in exactly where you left off.

Among the functions offered by Click are a calendar, diary and alarm, main memory save to disc, ADFS tree structure display, disc editor and backup and memory editor.

You will be able to see and by the *Click* cartridge at the show. It costs £60.

Wild video for A3000

Computer video specialist Wild Vision is at the show with the latest model in the range of Chroma genlock cards for superimposing computer graphics and text on video pictures for captions and effects.

The Chroma 200 is designed for the A3000 and costs just £199 making the complete package one of the cheapest captioning systems on the market. It is similar to the £295 Chroma 300 models already sold for the Master and Arc but it includes an RGB output. Wild Vision says stocks will be limited at the show so video buffs must get in quickly.

Scanning the stands

Handscanners are top of the show launch list for both the BBC and Arcs.

The Archi Hand Scanner, from Watford offers powerful Rom-based software, directional copying and the option to save scanned images as sprite files. It costs £171.

Watford's high resolution £155 BBC Handscanner scans photos, drawings and documents at 100 or 200 dots per inch. It also simulates grey scale reproduction and includes firmware enabling images to be read directly into Watford's desktop package, *Wapping Editor*.

Also not to be missed is Computer Concepts' A5 half-width scanner, Scan-Light Junior. Providing Rom board software and suitable for any Archimedes, at £217.

Software shows up

There's plenty on the software scene at *BBC Acorn User* Show, with many new products to be seen.

Colton Software is all set to unveil *Pipedream III,* a brand new Risc OS version of its successful wordprocessing and spreadsheet package. It runs on all Arcs, including the new A3000, and costs £170.

A new Arc compiler package, *ABC65,* can be found on the Dabs Press stand. It generates 6502 machine code and compiles programs on the Arc to run on a BBC. Also lined up from Dabs is *Instigator,* a 'programmer's toolbox' module with over 80 commands.

Following the success of its *Designer Castle* package, Data Design aims to display its forthcoming wild west town, while selling copies of its *Medieval Village*.

A selection of multi-tasking art and business software can be seen on Minerva's stand. Copies of its *Atelier* art package, which has a 256 colour capacity and is fully Risc OS compatible, can be had for £100.

Also available from Minerva will be *Multistore,* its new multi-tasking database for desktop computers which aims to make worn address books tools of the past.

Mitre Software's new *TimeWatch* organiser package is also suitable for busy lifestyles. Complete with 'Notes', 'Appointments' and 'To Do' sections, the Risc OS package was written especially for the Archimedes and offers a fast searching facility.

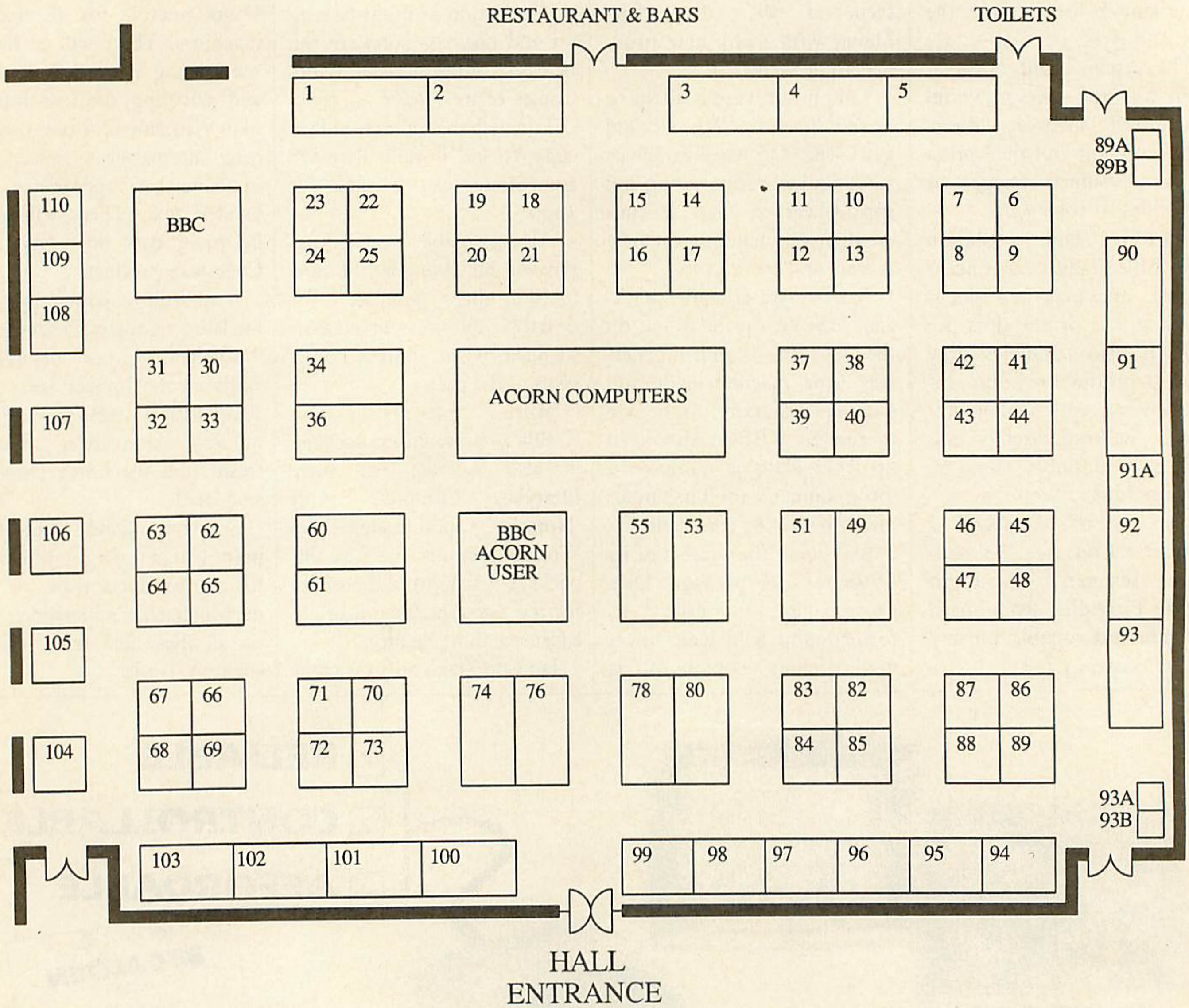
Ian Copestake Software will show a wide range of Power Fonts suitable for all Acorn machines. There will be fonts specialising in wordprocessing and covering unusual topics like Vietnamese, while others offer alternative typefaces to improve the appearance of printed text. There will also be price cuts on every Ian Copestake product!

You will, of course, see all the latest on the games scene.

Challenge your dribbling skills on the Impact Software stand with *Arcade Soccer*, a fast moving simulation match fresh from the Forth Dimension label.

See our stand guide to point you in the right direction for the products ready to be demonstrated and snapped up on all these and many other exciting stands!

STAND BY STAND



Ace Computing	25
Akom	110
Argus Specialist Publications	43
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Escroe	83
4th Dimension	60
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Hybrid Technology	100
Ian Copestake Software	21
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PMS	79
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Spacetech	109
Superior Software	76
Techsoft UK	19
The Serial Port	106b
Topologika	105a
Videk	8
Watford Electronics	49 & 51
We Serve	24
Wight Scientific	104
Wild Vision	37,38,39 & 40

Getting there

The 1989 *BBC Acorn User* Show is to be held in the West hall of Alexandra Palace in North London.

Recently renovated after the catastrophic fire, Alexandra Palace is situated half way between Muswell Hill and Wood Green, and is served well by all forms of public transport.

The times of the show are as follows: Friday July 21st 3pm-9pm, Saturday July 22nd 10am-6pm and Sunday July 23rd 10am-6pm.

Tickets on the door cost £3.50 for adults and £2.50 for children under 16.

For those travelling by car from other parts of London, the map should provide you with all you need to know to arrive there in plenty of time.

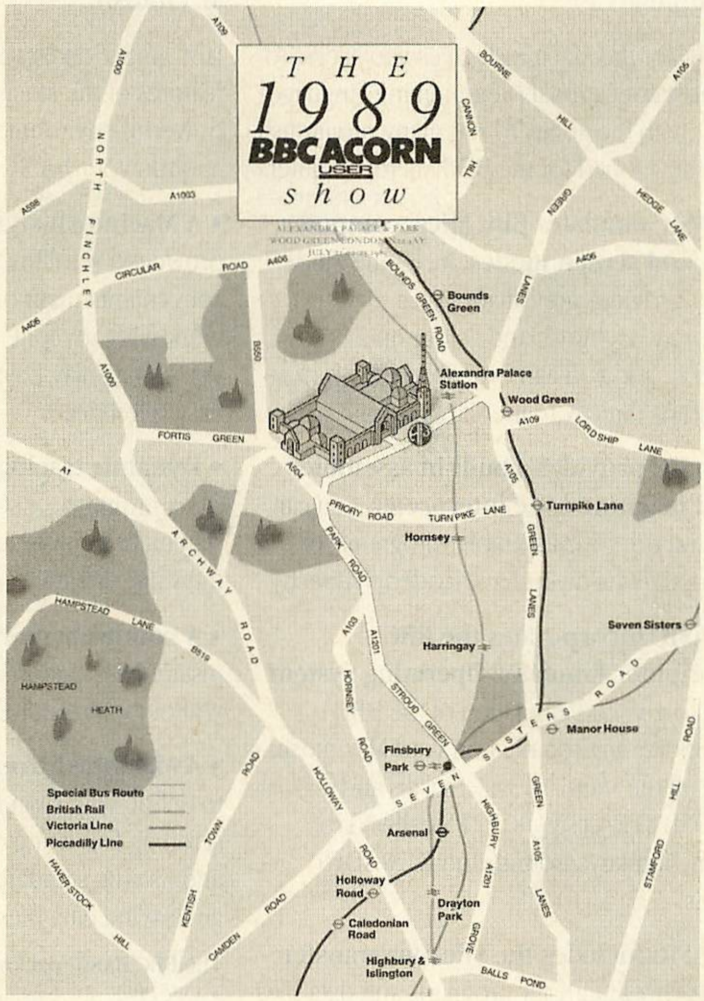
There is extensive and free parking space for around 2,000 cars in the Palace's grounds and within easy walking distance of the hall.

For those coming from further afield, Alexandra Palace is about 45 minutes from junction 25 off the M25.

Major roads for a considerable distance in all directions are well signposted.

The show is also well served by public transport of all kinds.

Alexandra Palace station is on the British Rail line from King's Cross and the journey takes around 10 minutes.



The W3 bus operates a speedy shuttle service from the station up the (very steep) hill to the hall.

If you come on the underground then get out at either Wood Green or Finsbury Park on the Piccadilly line where the W3 shuttle also picks up.

Enumerable other buses criss-cross North London within reach of Alexandra Palace. If you have any difficulty, London Transport operates a telephone inquiry service on 01-222 1234.

Watch with Auntie (and listen too)

The *BBC Acorn User* show won't be missing out on the BBC part of the name. Greater London Radio (GLR) will be heavily featured at the show on the BBC's stand.

GLR will be broadcasting live from the show on Saturday afternoon interviewing exhibitors and visitors and reporting on what there is to see. When not actually broadcasting live, GLR will also be providing background music for the hall and several well known guest DJs will be doing their stuff on the BBC stand.

BBC TV will also have an outside broadcast unit at Alexandra Palace and a 'newsroom' for visitors to try reading the news from an autocue in front of the TV cameras.

There you will soon discover that it's not as easy as the professionals make it look, but everyone who has a go will leave with a momento of their moment of fame.

Look and learn

The *BBC Acorn User* show is a time for learning as well as buying. A range of seminars will be held in the Londesborough room next to the West Mall throughout Saturday and Sunday. Six seminars are planned, each will last for approximately three quarters of an hour starting on the hour from 11.00am.

Presentations will cover, computer art, music, Risc OS, DTP, comms and the complete Acorn product range.

The running order of the seminars was not fixed at the time of writing but a complete programme will be published in the Palm Court reception area of Alexandra Palace.

Entrance to the seminars is free but there is a limited number of seats. Tickets are available from the Acorn stand.

WIN WIN WIN

As well as the presentation of the prizes for the Watford Electronics Win an Archimedes competition from the March 1989 issue of *BAU* and the Win an A3000 competition in the June and July issues, the *BBC Acorn User* Show offers you the chance to win a bumper hamper of software.

Seven software hampers, each worth £1,000, will be given away to lucky ticket number holders, one on the Friday and three each on Saturday and Sunday.

For London visitors, Greater London Radio will be running a Win a Micro competition in the week leading up to the show.

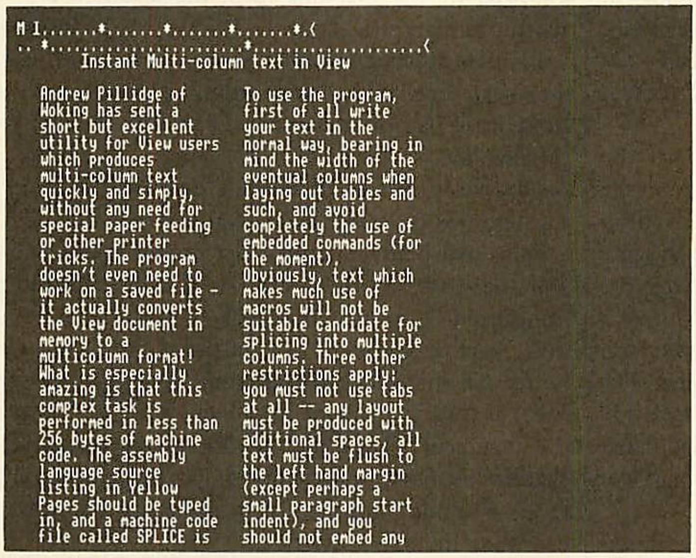
HINTS & TIPS

MANY COLUMNS IN VIEW

Produce multi-column View text, sort out your printer, extend your line-commands, and transfer to Psion Organisers

David Atherton

Andrew Pillidge of Woking has sent a short but excellent utility for *View* users which produces multi-column text quickly and simply, without any need for special paper feeding or other printer tricks and it earns him £15.



```
M I.......*.......*.......*.......*.<
.. *.......................*.....................<
      Instant Multi-column text in View

   Andrew Pillidge of        To use the program,
   Woking has sent a         first of all write
   short but excellent       your text in the
   utility for View users    normal way, bearing in
   which produces            mind the width of the
   multi-column text         eventual columns when
   quickly and simply,       laying out tables and
   without any need for      such, and avoid
   special paper feeding     completely the use of
   or other printer          embedded commands (for
   tricks. The program       the moment).
   doesn't even need to      Obviously, text which
   work on a saved file -    makes much use of
   it actually converts      macros will not be
   the View document in      suitable candidate for
   memory to a               splicing into multiple
   multicolumn format!       columns. Three other
   What is especially        restrictions apply:
   amazing is that this      you must not use tabs
   complex task is           at all -- any layout
   performed in less than    must be produced with
   256 bytes of machine      additional spaces, all
   code. The assembly        text must be flush to
   language source           the left hand margin
   listing in Yellow         (except perhaps a
   Pages should be typed     small paragraph start
   in, and a machine code    indent), and you
   file called SPLICE is     should not embed any
```

Convert your View documents to multi-column format

The program doesn't even need to work on a saved file – it actually converts the *View* document in memory to a multi-column format! What is especially amazing is that this complex task is performed in less than 256 bytes of machine code. The assembly language source listing in the yellow pages should be typed in, and a machine code file called SPLICE is generated.

To use the program, first of all write your text in the normal way, bearing in mind the width of the eventual columns when laying out tables and such, and avoid completely the use of embedded commands (for the moment).

Obviously, text which makes the use of macros will not be a suitable candidate for splicing into multiple columns.

Three other restrictions apply. You must not use tabs at all – any layout must be produced with additional spaces, all text must be flush to the left hand margin (except perhaps a small paragraph start indent) and you should not embed any further rulers into the text.

Don't worry, if some of these are essential, you can do them after the splicing. Highlights are allowed as normal. When you have your text prepared, return to the top of the text and make two rulers. The first should be the width of the entire document and in this ruler, you should make tab stops (asterisks) for the start of each column.

For this example, we will stick with two columns and the second ruler, immediately under the first, should be the width of the first column.

As this second ruler now becomes the active ruler for the text you have written, reformat your text to the narrow extent of it. You can do this paragraph by paragraph using fo or you can do the lot by pressing ESCAPE and typing FORMAT from command mode. This method is quicker, but loses control over which paragraphs should be formatted.

The next stage is planning which text is spliced. Work out where you want column 1 to start, and column 2 to start. You will probably start column 1 after your heading, and start column 2 the requisite number of lines down the page to fit your paper size.

Insert marker 1 where column 1 will start and insert marker 2 where column 2 will start. The program is not intelligent. It cannot work out how deep you want the column to be.

The next point is absolutely critical. There must be at least as many lines from marker 2 to the end of the document as there is from marker 1 to marker 2. Judicious use of the |L variable, which counts lines, and SCREEN may prove useful here. If there are less lines in column 2, insert some blank lines at the end of the document. The program inserts the 'end of text' marker at the end of column 2, so you would lose any extra lines in column 1.

Having inserted markers 1 and 2, formatted the text, and counted your lines, the next stage is to run the SPLICE program. Splicing is a one-way, permanent process, and cannot be undone. It's a good idea at this point to save your unaltered file.

Return to Command mode, and type *SPLICE (or *RUN SPLICE from tape). The program takes only a short time to run. When you press ESCAPE again, you will see your text has doubled in width.

The next stage is to delete the small ruler at the top of the text, allowing the layout to be determined by the wide ruler above it. Delete this ruler and, as if by magic, the text will reformat into two columns, justified or unjustified according to your original settings. Moving the tab stop will reposition the column more precisely, and you can now go to the bottom of the text and delete any surplus blank lines left over.

Unfortunately the format command will no longer correctly format text but you can adjust centred items and embed commands in the left hand margin.

If you want to format more than two columns, some care must be taken. The program simply takes two chunks of text 'marker 1 to marker 2' and 'marker 2 for the same number of lines as the first chunk' and appends each line of the second chunk onto the corresponding

line of the first chunk, replacing 'soft' carriage returns with tabs.

If you want to make three columns, work out the number of lines for column 1, set the markers and perform the splice, set the markers again (the wide two-column text will have the same number of lines as column 1 alone had before) then perform the operation again.

If you had, say, three lines of heading, exactly 180 lines of text (when measured on a 40 column ruler) to be set in three columns of 60 lines, and three footer lines you would set marker 1 at line 4, and marker 2 at line 64, and splice. Lines 4 to 64 would become two-column lines with a further 60-line narrow chunk sitting below these.

Now set marker 1 again at the beginning of line 4 and marker 2 at the new line 64 (the start of the unspliced text) and splice again. Three 60-line columns will now exist, just leaving the footer text at the bottom. Now insert a new ruler, so that the footer text can stretch all the way across the page. The principle can be extended to produce any number of columns, the limit being that the maximum width of a *View* document cannot exceed 136 columns.

It is also possible to produce columns and parts of columns of unequal width. Remember the splice program simply appends lines to other lines. It is not concerned with layout. After preparing your text in a narrow measure, it is perfectly possible to insert additional rulers and reformat paragraphs to suit. Reformat a single paragraph with fo, and delete the special ruler. *View* does not reformat again without being told so the extra or reduced width is retained. After splicing, of course, the lines in question, will have to be tabbed out correctly with an additional ruler.

A fair degree of planning is needed to get good results from this program but the work is worthwhile. Unless you have a wide carriage printer, you will probably get the best results by printing in condensed type.

Another small tip concerns the use of horizontal lines between the columns. As each column is separated by a tab, a search and replace 'tab' to 'tab plus vertical bar plus space(s)' will build a vertical line between two or more columns. The *View* command, from command mode is: CHANGE ^T ^T|^S.

The ^T denotes a tab, and the ^S denotes a space. Use REPLACE instead of CHANGE if you don't want to replace all tabs. The program is like a riffle shuffle of cards – cutting the deck in half and interleaving one from the bottom half between each one from the top half.

Using the position of the markers, the program copies all the text from marker 1 to marker 2 into a buffer in the free space past the end of the *View* document. (The first zero byte after OSHWM+&100 marks the end of the document). It then puts back the first line of this buffer (changing the carriage return to a tab) followed by the first line from the text starting at marker 2.

Pointers are maintained to show where the next line will come from. Each subsequent pair of lines is copied back in this manner.

Obviously, at a point roughly halfway through this process, the original marker 2 point will be over written but no data will be lost as this text is already transferred. Note that no check is made that there is enough free memory to buffer the first block (check your 'Bytes Free' against the size of the block) so if the document is large and you don't have shadow memory, split it up, or go into mode 7 (mode 6 on the Electron) before executing the splice program.

The program makes 'illegal' use of *View* workspace, reading the addresses of the markers from &53/&54 (marker 1) and &55/&56 (marker 2) (one byte higher on Electron *View*, for which this program was originally written) and &8/&9 for the current line.

The program itself uses 16 bytes of zero page, currently set to the Econet workspace &90-&9F. The program resides in page 9, which is safe for all applications other than serial or cassette input.

£10 PRINTER HEX DUMP

When you are writing software to control a printer, it is often difficult to work out what is going wrong if the printer is not generating exactly the right output as you intended.

This is especially true when sending control codes and graphics – the output is obscured by the effects that do get through. Many printers have a very useful hex mode which instead of actioning characters and codes, prints out every code it receives in the form of hex pairs (the value of each Ascii code in hexadecimal). All codes are converted, so not even carriage returns are 'printed'.

Some printers do not have this hex mode which, as you can imagine, makes debugging difficult. However, with the routine supplied this month by David Spencer of Spalding, any printer can work in an imitation hex dump mode, simply by installing a short machine code routine before anything is ever sent to the printer.

To use the program, simply type in and run the program in the yellow pages (listing 2). This creates a machine code file called HEXDUMP. Before you do any printing, *RUN this program (disc users simply type *HEXDUMP) and all subsequent output sent to the printer will appear as hex codes.

So if you typed VDU 2,1,27,1,69,3 (which would normally make an Epson-compatible printer select emphasised mode) instead you will simply get 1B 45 (the hex for 27 and 69) printed on the paper, and of course the mode in question will not be selected.

It is not only in your own programs that this utility can be used. You can test the output from art packages, printer control Roms (such as Computer Concepts' *Printmaster*) and similar programs, to see what output is actually being sent to the printer.

The program works by intercepting REMV, the vector used every time the operating system removes a character from a buffer. However, only if the X register is set to 3 (printer buffer) is any action taken.

The new code takes a character from the buffer, works out the Ascii codes for the byte represented in hex and puts these back to be sent to the printer. A counter is set in the 'pend' routine to work out when these characters have been sent so the hex codes themselves are not again interpreted as more printer characters.

Four bytes are generated for each original value – the hex character pair, with a space on each side. Two spaces are used, so that the total output is a divisor of 80. This allows subsequent lines to line up properly.

The interception is made in such a way that initialising the routine again causes no damage. There is, however, no facility to 'unhook' the routine, although one could easily be written. As it stands, you will have to press BREAK to send normal output to the printer.

£10

AUTO EXTENSION

Machiel Jansen from Lisse in the Netherlands has sent a nice extension to Basic's AUTO command. This command inserts line numbers for you to save a bit of time entering a Basic program.

Often the feature is used to enter lines of a repetitive command, ie PRINT, DATA or REM, and it would be nice if other automatic text could follow the line number.

Machiel's utility lets you put any other text after the line number, simply by programming that text into function key 0 (or any other f-key for that matter).

To use the program, run listing 3 which will create a file called AUTOSTR. When you want to use the program, type *AUTOSTR, and a short message tells you the program is installed.

At any time before or after this, issue a *KEY0 command to set up f0 with the string you wish to insert after the line number and then type AUTO in the normal way. The text in f0 is inserted after the line number.

To remove the AUTOSTR feature, simply press BREAK. You can leave AUTO mode, and reprogram f0, and when you re-enter AUTO the new string will be inserted instead.

You must remove AUTOSTR before entering another language or the machine will crash, as the program alters memory locations which only make sense to Basic. The utility works with all versions of BBC Basic.

The program redirects the RDCH vector (at &0210) and before each character input, checks if it is the first input on the line and if Basic is in AUTO mode. If both conditions are true then character &80 is inserted in the keyboard buffer which is expanded by the operating system to the contents of f0. Couldn't be simpler!

£10

ONE LINE CONVERTER

Another quickie from one line expert Phil Bender – a one line base converter.

The function converts a number in any base to the equivalent decimal value. It takes three arguments – the number to be converted as a string, a second argument for internal use only and the base of the first argument. The second argument should always be zero when calling the function.

For example PRINT FNdec("100",0,8) will print 64. (100 is the octal or base eight representation). The brevity of the function relies on its recursion, dealing with each character of the string in turn.

```
DEF FNdec(num$,dec%,bas
e%):IF num$="" THEN =dec%
ELSE =FNdec(MID$(num$,2),d
ec%*base%+EVAL("&"+LEFT$(n
um$,1)),base%)
```

A brief demo is on the monthly disc.

£10

PSION ORGANISER TO VIEW

As a follow up to Simon Hewitt's article on the Psion Organiser in the May issue of *BAU*, John Hammond from Dublin has sent information on transmitting data from the Organiser directly into *View*, without the need for a program to be loaded at the Beeb end.

This is ideal if you just want to quickly push a few names and addresses into *View*, without any conversion, as offered by Simon Hewitt's program.

With a Comms Link and BBC adapter lead, set up your Organiser using Setup from the Comms Link menu, with the following values:

BAUD	9600
PARITY	SPACE
BITS	7
STOP	1
HAND	RTS
PROTOCOL	NONE
ECHO	LOCAL
WIDTH	NONE
TIMEOUT	NONE
REOL	<CR> <LF>
REOF	<SUB>
RTRN	NONE
TEOL	<CR> <LF>
TEOF	<SUB>
TTRN	<HT> <CR>

Only PARITY, BITS, HAND, ECHO and TTRN need to be changed. The other items are the default settings. You can save these settings on the Organiser as SETVIEW. Once you have done this, all you have to do to make the Organiser dump files directly into *View* is plug in the link, select *WORD on the BBC micro and type the commands *FX7,7, *FX8,7, *FX2,1. Now press ESCAPE on the BBC to enter *View* edit mode and from the Comms Link menu on the Organiser, load SETVIEW and select Term.

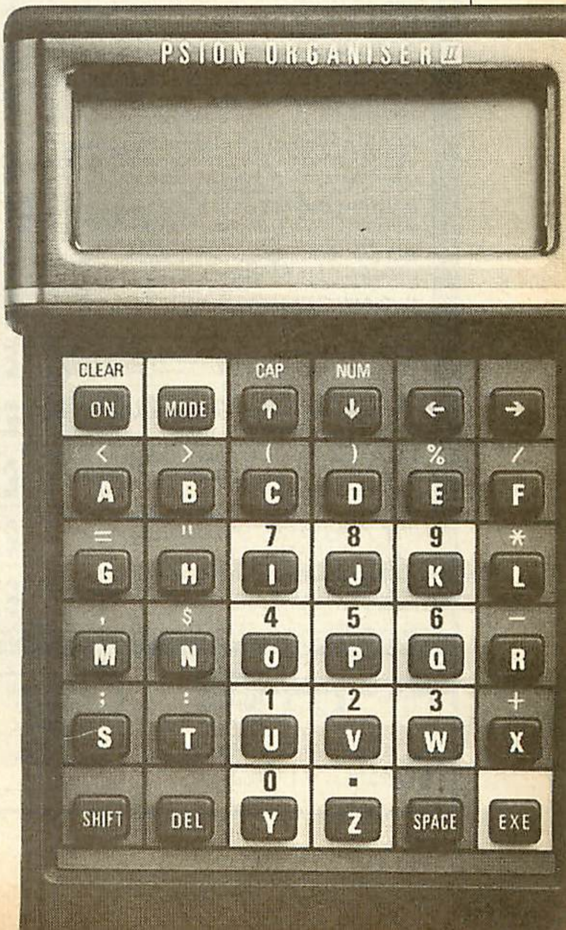
On the Organiser, select TRANSMIT, and then the name of the file, press EXE and the file will appear in *View*. Press ESCAPE on the BBC when done.

EXIT from TRANSMIT on the Psion, and enter Term. Finally, type *FX2 on the Psion (SHIFT-L,F,X,SHIFT-V,EXE) and Control now returns to the BBC so you can save or edit your file. The whole process only takes a couple of dozen keystrokes.

The *FX7,7 and *FX8,7 are not required on a BBC B, nor on a Master if the *CONFIGURE BAUD is set to 7. The settings for the Organiser are different to those in the May article. These are designed to exactly match the Beeb's default protocols, to minimise the number of commands. The TTRN parameter translates the tabs between each field to carriage returns to obtain a neat format in *View*. Note that the HT character is input as Ascii 9, see the Psion manual for inputting Ascii codes.

Incidentally, while in Term, anything you type on the Organiser (before issuing the *FX2) will be treated as typed on the BBC – except ESCAPE, which must always be typed on the BBC keyboard.

The Organiser XP (or expanded CM) has more free memory than the Beeb and it is possible the file may be too big for *View*. If you think this may happen, select mode 7 in *View* before starting the whole transfer process.



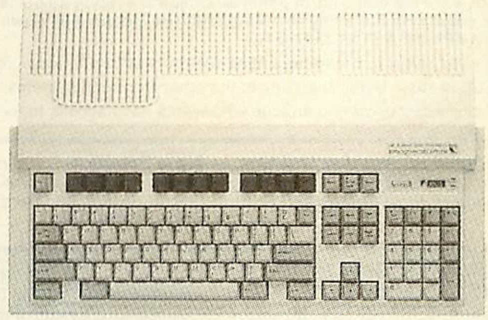
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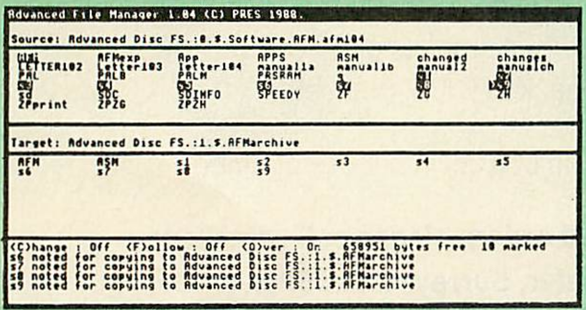
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Screen picture shows AFM in Copy mode on Master Turbo

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DELETE – allows files to be marked and then deleted with one keystroke.

RENAME – allows one or more files to be marked and then renamed using a wildcarded name, ie one which varies with each file renamed. Thus you could rename s1, s2 and s3 to be s1_old, s2_old, and s3_old in one operation. . . and that's only the beginning! As well as using the whole of the original name you can also pick out individual characters to form part of the new name.

COPY – the strongest feature of AFM. It is a two stage copy routine. With both source and target directories shown on screen the files to be copied are marked. Once all the files have been marked copying is started and the computer can be left to get on with it!
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AMB15 Master 128 **£439(a)**

The Master package includes: *View Word processor and Viewsheet spreadsheet software and EITHER Educational/Fun software bundle with STARdataBASE package OR A 200K 40T DS single drive TS200. Please specify your choice.*

ADC06 Turbo 65C102 Module	£115(c)
ADF10 Econet Module £49(c) Acorn Rom Catridge	£13(d)
ADJ22 Ref Manual I £14(c) ADJ23 Ref Maual II	£14(c)
TRC32 32K RAM Cart. £15(d) Master Dust Cover	£4.75(b)
Universal CoProc Adapter	£49(b)
BBC Domesday System	£2,500(2Xa)

ECONET ACCESSORIES

Stacking Filestore E01S	£999(d)
Filestore Hard Disc E40S	£899(a)
Filestore Hard Disc E60S	£1199(a)
Econet Starter Kit £85(b) Econet Bridge	£174(b)
Econet Socket Set £29(c) Printer Server Rom	£41(d)
File Server Level II £75(b) 10 Station Lead Set	£34(d)
Master FS Utility Disc	£17.25(d)

Multi I/O System for ARC

A multi I/O card utilising ultra-miniature technology proivdes five different facilities on a half euro card at *budget price:*

Video Digitiser digitises stationary picture sources (2 sec scan inmodes 12 & 15) to 256 levels of grey. Ideal for use with video recorders and cameras.

Sound Sampler: a highly quality stereo sound sampler with 8 bit res and four-fold over sample setting. Optional breakout box available for colour.

A full RS232 interface with all modem control lines. + 10V levels are used for driving the RS232 lines.

3 ROM sockets for all ROMs upto 128K (32 pins) and softwre for ROM and RAM filing systems.

Joystick interface provides a dual channel joystick connector through a 15 way D connector.

Software for all facilities listed plus full range of SWI and star command included in firmware on board. Optional breakout box to provide colour on digitised pictures to be available soon.

Multi I/O board for only £107(b)

R140 UNIX SYSTEM

Technomatic are now authorised UNIX dealers and have UNIX systems on display. Please phone in to arrange for a demonstration or detailed literature.

SPECIAL DISCOUNTS

We can provide attractive discounts to **Education Authorities, Schools, Colleges** and **Health Authorities.** Simply phone us or write, outlining your requirements, and we will supply a quotation.

Extended Finance

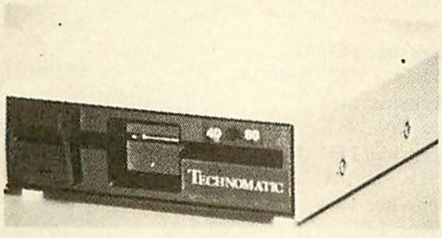
We can offer extended finance for 11 months under our special offer detailed above or for 24/36 month period at 12.75% (approx APR 26%). Please send for details. Technomatic is a licensed credit broker.

All prices ex VAT and subject to change without notice. See page 6 for Carriage Charges.

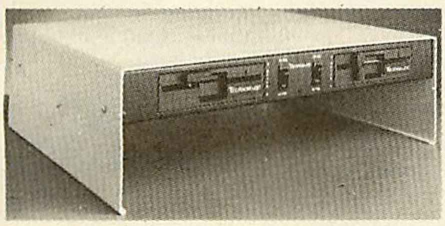
TECHNOMATIC

Techno House 468 Church Lane, London NW9 8TQ. Tel: 01-205 9558 Fax: 01-205 0190

TECHNOMATIC DISC DRIVES



TS 400



PD 800P

A range of high quality high performance drives to meet the needs of all BBC Micro Users.
*All drives are fitted with high quality slim line ultra low power mechanisms capable of single and double density operation and offering fast track access and head setting times.
*5.25" floppy drives are fitted with 40/80 track switches as standard at no extra cost. The switches are located in the front and clearly marked to indicate the status at a glance.
*The mechanisms are set inside attractively styled, sturdy metal casings painted in BBC beige colour.
*All drives fitted with all necessary leads and are ready for operation on unpacking. The drives with the mains power supply are supplied with a mains lead fitted with a suitably fused 13A moulded plug.
* TECHNOMATIC drives stand out from other drives because of elegance in design, high quality of construction and use of reliable switch mode power supply units (on dual drives).
*Our plinth drives have been thoughtfully designed and provide a choice of two 5.25" drives or a combination of 5.25" and 3.5" drives. The plinth drives are designed to give a professional look to the system installation and at the same time provide considerable space saving. Their rugged construction ensures that there is no sagging under the weight of even a 20" monitor.

5.25" Single Drives 40/80 switchable:
TS400 400K/640K — **£80(b)**
PS400 400K/640K with integral mains power supply — **£90(b)**

5.25" Dual Drives 40/80 switchable:
TD800 800K/1280K — **£160(a)**
PD800 800K/1280K with integral mains power supply — **£170(a)**
PD800P 800K/1280K with integral mainspower supply and monitor stand — **£185(a)**
PD800 Case with psu & data cable — **£42(b)**
PD800P Case with psu & data cable — **£75(a)**

PS400/PS351 are Compact/Archimedes compatible.
PD800/PD352/PD853 are Archimedes compatible.

3.5" 80T DS Drives:
TS351 single 400K/640K — **£69(b)**
PS351 3.5" single drive with integral mains power supply in a 5.25" case. — **£95(b)**
TD352 Dual 800K/1280K — **£126(a)**
PD352 3.5" dual drive with integral mains power supply in a 5.25" case. — **£139(a)**

Combo Drives (5.25" & 3.5" drives)
PD853 with integral psu — **£180(a)**
PD853P with integral psu — **£205(a)**
(Combo drives in plinth mounting).

DISC DRIVE MULTIPLEXER
For Master, B, B+ and any DFS/ADFS
TDM2 Two computers/one drive unit — **£65(b)**
TDM4 Four computers/one drive unit — **£115(b)**

SPECIAL OFFER

TS200 40T DS
only **£65(b)**
(offer valid whilst stock last)

AEDA
ARCHIMEDES EXTERNAL DRIVE ADAPTOR

Technomatic's AEDA provides a reliable external disc drive adaptor with a variety of novel features.

★ It is designed for easy and neat installation and takes only a few minutes to instal. Rear fixing plate is supplied in two halves so as not to interfere with existing expansion boards or those likely to be installed in future.

★ It is fully buffered and allows up to three external drives (3.5" or 5.25") to be connected.

★ Externally located toggle switch allows selecting either internal or external drive as drive 0 or drive A. This feature is particularly useful when booting up from the external drive is required.

★ AEDA is supplied configured for one internal and up to three external drives. On board options allows for reconfiguration to two internal and two external drives.

★ Other on board options allow setting 'disc eject' from the keyboard if the drive is capable of this facility.

Technomatic AEDA — **£30(c)**

MASTER COMPACT ADD-ONS

128K RAM, 640K 3.5" DS Drive + Educ software and our bundled Educ/Fun package included

Entry System	**£310(a)**
with 12" Mono Monitor	**£375(2×a)**
with 14" Col Monitor	**£475(2×a)**

2nd Drive Kit	**£90(c)**	Serial Kit	**£25(d)**
Mertec Adaptor	**£35(c)**	TV Modulator	**£26(d)**
Ext Drive Adaptor	**£9(d)**	Printer Lead	**£7(d)**

WINCHESTER DRIVES

Most popular range of Winchesters for BBC at competitive prices.

Single Winchesters, housed in attractively styled metal enclosures in BBC matching beige colour are fan cooled and powered by switch mode power supply for quiet, efficient and reliable operation.

Winchester/floppy combination drives, housed in our elegant plinth housing.

To get the most from the Winchester, the following utilities are installed on the drives:

★ TREE PLAN: A utility to create an organised directory structure and display it on the screen or dump it to a printer.
★ Formatter and verify program.
★ For Master users our popular front end utility to display the entire contents of the drive in icon format. Files can be loaded simply by pointing at the icons.

P30HD 30Mb Winchester — **£410(a)**
P304HP* 30Mb Winchester + 640K DS 40/80T floppy — **£609(a)**

*(mounted in plinth type casing)
Larger drives available on request.

UPGRADE KITS

1.20S ROM	£15(d)	ADFS ROM	£26(d)
DNFS ROM	£19(d)	1770 DFS Kit	£49(d)
BASIC II ROM	£22.50(d)	Econet Kit	£55(d)

RAM/ROM EXPANSION

ATPL Board for Model B. Simple to instal, no soldering. Allows expansion to 15 Roms + 2*8K RAMS — **£37(c)**
ATPL Battery backup kit — **£18(d)**
ATPL Board for BBC+ (10 Roms) — **£31(c)**

3M FLOPPY DISCS

5.25" Discs in packs of 10

744 40T SS DD	**£6.50(d)**
745 40T DS DD	**£7.00(d)**
746 80T SS DD	**£12.00(d)**
747 80T DS DD	**£11.00(d)**

(Add £1 for library case packing)

3.5" Discs in packs of 10

80T SS DD	**£10.00(d)**
80T DS DD	**£11.75(d)**

Voucher for free Quartz wrist watch with every purchase of 5 packs of 3M discs whilst stocks last.

BULK DISCS

50 5.25" 40 T single sided discs with sleeves in lockable box. — **£20(b)**
50 5.25" 80 T double sided discs with sleeves in lockable box. — **£25(b)**
40 3.5" 80T DS Discs in lockable box — **£38(b)**

FLOPPICLENE DRIVE HEAD CLEANING KIT
5.25" Kit with 20 disposable discs — **£14.00(d)**
3.5" Kit with 20 disposable discs — **£14.75(d)**
Conventional DriveHead Cleaning Kit (pse specify 3.5" or 5.25") — **£4(d)**

DISC STORAGE BOXES
DB340 Lockable 40 × 3.5" — **£6(c)**
DB380 Lockable 80 × 3.5" — **£7(b)**
DB550 Lockable 50 × 5.25" — **£6(c)**
DB100 Lockable 100 × 5.25" — **£7(b)**

EPROMS/RAMS

2764-25	**£2.80**	27256-25	**£6**
27128-25 (12.5vVpp)	**£4.50**	27128-25 (21vVpp)	**£6**
27512-25	**£9**	6264LP-15	**£6**

These prices subject to change (Carriage code d)

All prices ex VAT and subject to change without notice. See page 6 for Carriage Charges.

TECHNOMATIC

Techno House 468 Church Lane, London NW9 8TQ. Tel: 01-205 9558 Fax: 01-205 0190

PRINTERS & PLOTTERS

EPSON

LX800	£165	LQ500	£265
FX850	£295	LQ850	£415
FX1050	£395	LQ1050	£569
EX800	£429	LQ2550+	£919

GQ3500 Laser £1199

NATIONAL PANASONIC

KXP1081 incl Master Lead			£139
KXP1124	£269	KXP1540	£435

INTEGREX

132 Inkjet Colour	£515
COLOURCELL Inkjet	£2750

PLOTTERS

Hitachi 672XD A3 4 col	£479
Plotmate A4S	£379
Plotmate A3M	£549

Roland A3 FLATBED PLOTTERS

DXY880A	£525	DXY1100	£625
DXY1200	£865	DXY1300	£1025

All above items are carriage (a).

STAR

LC10	£169	LC10 Col	£215
LC24-10	£275	NB24-10	£449

TAXAN

KP815	£155	KP915	£275

NEC

P2200	£269	P6+	£439

P7+ £579

HP

Laserjet Series II Laser	£1349
Deskjet	£520

PRINTER ACCESSORIES

SERIAL INTERFACES

Epson 8143	£32(d)	Epson 8148 (8K buffer)	£79(d)
Nat Pan KXP17	£39(d)	Taxan	£49(d)

RIBBONS

LX80/86/800, MX/RX/FX80/85/800/850	£4(d)
MX/RX/FX100, FX105/1000/1050	£6(d)
LQ500/800/850	£5(d)
LQ1000/1050, EX800/1000 (Black)	£8(d)
EX800/1000	£16(d)
LQ2550, JX80	£13(d)
StarLC10/NL10, NatPan KXP1081	£4(d)
LC10 Colour	£6.50(d)
Taxan 810/815/910/915	£5.75(d)
Integrex Black Cartridge	£8(d)
Integrex Colour Cartridge	£14(d)
Juki 6100 £1.80(d) Brother HR15/20	£4(d)
HI80 Pens (4) (Aqueous or Oil Based)	£6.90(d)
Hitachi Pens (6) Aqueous £18.50(d)	Oil £25(d)
Colour option EX800/1000	£35(d)

CUT-SHEET FEEDERS

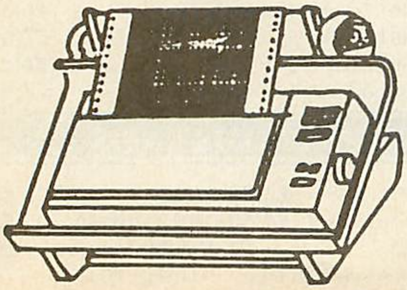
LX800	£70(b)	LQ500	£75(b)
FX/LQ/800/850	£135(b)	FX/LQ1000/1050	£179(a)
EX800	£150(b)	EX1000/LQ2500	£210(a)
Star LC10	£55(b)	Brother HR20	£229(a)

TRACTOR FEEDS

LQ800	£44(b)	LQ1000	£55(b)
LQ850	£70(b)	LQ1050	£85(b)

PRINTER STAND

A new style printer stand with easy paper feed and paper seperation, provides complete access to paper. Can be used with both top and bottom paper feed. Very space efficient. **£26 (b)**

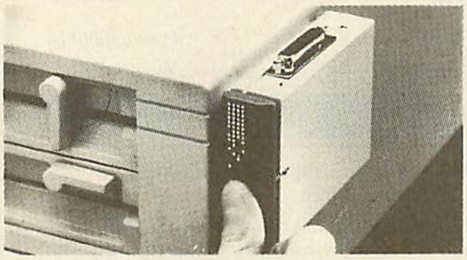


BUFFERS & SHARERS

TSB 256 Auto Sharer/Buffer
256K buffer with 3 input ports. Each port scanned automatically every 10 secs until data found. PAUSE, COPY and RESET Facitilies. Full spec on request. **£169(a)**

Smart Printer Buffer 256K
256K parallel buffer with facilities for 256 copies, PAUSE, RESET & SELF-TEST **£149(b)**

Compact Two Way Switch
A economical solution for connecting two computers to one printer or one computer to two printers. Easily attaches to the side of compute or monitor (specify parallel or serial) **£21(c)**



Manual Printer Sharers:

(All lines are switched).	Parallel	Serial
2 computers to one printer	£23(c)	£23(c)
3 computers to one printer	£30(c)	£30(c)
4 computers to one printer	£36(c)	£36(c)
2 computers to 1 or 2 printers	£49(c)	£49(c)

Cable sets for above sharers available for all popular computers

BBC Computer Sharer: TCS26
1 computer to 2 printers fitted with BBC cable £15(c)

Parallel Printer Leads

BBC/Master (1.2m)	£5(d)	BBC/Master (2m)	£7(d)
Archimedes (2m)	£7(d)	Compact (1.2m)	£7(fd)

Paper & Labels
Plain fanfold paper with microperforations:

2000 sheets: 9.5" x 11"	£11(b)
14.5" x 11"	£18 (£4.50)
1000 sheets: A4 80gsm	£11(b)
A4 90gsm	£12(b)
500 Loose A4 plain sheets	£3(c)
50 sheets Art paper 115gsm A4 £3(c) A3	£5(c)
100 sheets A4 OHP film	£45(b)

Labels/1000

Single Row 3½" x 1⁷⁄₁₆"	£5(d)
Double Row 3½" x 1⁷⁄₁₆"	£5(d)
Triple Row 2⁷⁄₁₆" x 1⁷⁄₁₆"	£5(d)

MONITORS

12", 14" and 20" MONITORS

Microvitec 1431
Std Res, 14" **£175(a)**

Microvitec 1431AP
Std Res + PAL/Aud, 14" **£199(a)**

Microvitec 1451
Med Res, 14" **£219(a)**

Microvitec 1451AP
Med Res + PAL/Aud, 14" **£255(a)**

Microvitec 1441
Hi Res, 14" **£359(a)**

Dust Cover for Microvitec 14" monitors **£5.50(d)**

Philips 8833 14" RGB
Med Res, 14", high contract screen, TTL/Linear input, Mono/Colour Switch Stereo Sound Input. Separate controls for brilliance and contrast. **£219(a)**

Touchtec 501 **£239(a)**

Acorn Philips
14" Colour Monitor **£199(a)**

Microvitec 2030CS
20" Standard Resolution RGB/Comp Video **£380(a)**

Microvitec 2040CS
20" High Resolution RGB/Comp Video **£675(a)**

TAXAN SUPER VISION 625
12" Super Hi Res and contrast RGB Monitor with option to switch to mono BBC/IBM compatible. **£269(a)**

TAXAN 770+
MultiSysnc Autoscan 14", ideal for utilising the hi res modes on Archimedes. Our price includes a tilt & swivel stand **£449 (a)**

VIKING II
19" Hi Res white screen monitor for CAD applications c/w Tilt & Swivel stand **£849(a)**

CM1686 16"
Hi Res colour monitor for use with hi res modes on 400 series. Res: 1280 x 1024. Complete with tilt & Swivel base **£1499(a)**

MONOCHROME MONITORS

PHILIPS 7502
Hi Res green screen **£72(a)**

PHILIPS BM 7522
Hi Res amber screen **£79(a)**

Tilt & Swivel Stand for Philips Mono **£6(c)**

MONITOR ACCESSORIES

Microvitec Swivel Base (14" plastic monitors)	£10(c)
Monitor Stand Models B & B+	£10(c)
Monitor Stand Master	£13(c)
Double Tier Stand Models B, B+ or Master	£24(b)
Taxan RGB Lead	£7(d)
Microvitec Lead	£4(d)
Monochrome BNC/Phono Lead	£4(d)
Copy Holder Self Supporting A4	£15(c)
General purpose tilt and swivel stand for 12" and 14" Monitors	£12(b)

MODEMS & SOFTWARE

MIRACOM WS4000 V21/V23	£115(b)	Termulator (B/B+)	£25(d)
MIRACOM WS3000 V22	£275(b)	Termulator (M)	£35(d)
MIRACOM WS3000 V22bis	£395(b)	MAYA (B/B+/M/Arc)	£49(d)
PACE LINNET V21/23	£129(b)	Commstar II (B/B+/M)	£28(d)

All modems carry a BABT Approval

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BBC FIRM/SOFTWARE

INTEGRATED PACKAGES

MEGA 3 ROM	£76(c)
Three ROMS in one Interword/Intersheet/Interchart	
MINI OFFICE	
The most economical package you can buy.	
Disc for Model B & B+	£14(d)
Disc for Master	£16(d)
Disc for Compact	£19(d)
(please specify 40 or 80T Disc)	
ROM Version (B,B+, M&C)	£43(c)

WORD PROCESSORS

Acorn View Professional	£50(c)
VIEW 2.1	£35(d)
VIEW 3.0	£45(c)
Double View Disc	£15(d)
View Printer Driver	£9(d)
WORDWISE	£24(d)
WORDWISE PLUS	£38(d)
INTERWORD	£36(d)
SPELLMASTER	£42(d)
EDWORD II	£39(c)
WYSIWYG PLUS	£15(d)
(What You See Is What You Get)	
A screen and printer utility ROM	

DATABASE SYSTEMS

Viewstore	£36(d)
Overview (for Master or Compact)	£65(b)
InterBase	£49(d)
STARdataBASE	£29(d)

SPREADSHEETS

Viewsheet	£36(d)
Windomatic	£15(d)
(utility to release the power of Viewsheet)	
Intersheet	£37(d)
Interchart	£25(d)

LANGUAGES

Acornsoft C	£29(d)
Acorn MicroProlog	£49(d)
ISO PASCAL	£51(c)
ISO PASCAL SAG	£30(d)
Oxford Pascal (B,B+)	£32(d)
Oxford Pascal (M)	£32(d)
Logotron Logo	£49(c)

NOVACAD (B,B+,M)

NOVACAD T/M Version	£39(d)
NOVACAD + Plotter DG	£49(d)
Plotter Driver Generator	£12(d)
*Techno*CAD	£99(c)

MARCONI TRACKER BALL

RB2 Stand Alone	£49(c)
(Specify if AMX compatibility reqd)	
RB2 with Pointer Rom (M)	£59(c)
RB2 with Icon Master (B,B+)	£59(c)

UNIVERSAL DEVELOPMENT SYSTEM

A set of three packages to meet the needs of any software developer for assembling, disassembling and emulating codes for over 30 processors. Packages are structured to work with new processors.

META Assembler	£90(b)
META Disassembler	£90(b)

COMMUNICATIONS

Termulator (B, B+)	£25(d)
Termulator (M,C)	£35(d)
MAYA Terminal Emulator	£49(d)
(Disc with ROM Image (B,B+, M,C,A)	
MAYA Terminal Em. ROM	£7(d)

PRINTER UTILITIES

Dumpmaster ROM	£26(d)
(screen dump utility for a variety of printers incl colour printers)	
Screen Print	£25(d)
(a powerful printer dump utility)	
Printmaster	£24(d)
(Versatile utility for Epson printers)	
WYSIWYG plus	£15(d)
Printer drive for any printer, compatible with View, WW, Interword. On Screen display of the actual typestyles/fonts chosen.	

UPGRADES

ADFS ROM	£26(d)
1770 DFS Kit	£49(c)
DNFS ROM	£17(d)
1770 DFS ROM	£15(d)
1.2 OS ROM	£15(d)
BASIC II ROM	£22.50(d)

TIME WARP for Models B & B+

Upgrade your model B or B+ computer to provide real time and date information at any time. Time Warp with battery back up fitted as standard simply plugs into the User Port. Demo Software on Disc includes a diary/planner application. **£29(d)**

SPARE PARTS

BBC B/B+ Power Supply	£52(b)
BBC B keyboard	£52(b)
BBC B Keyboard Connector	£4.75(d)
BBC B/B+ Video ULA	£18(d)
BBC B/B+Serial ULA	£12(d)
KeySwitch B,B+, M	£1.75(d)
(pse specify original type)	
UHF Modulator	£4(d)
16Mhz Xtal	£2.50(d)
17.734 MHz Xtal	£2.50(d)
6502A	£5.50(d)
4816 RAM (B)	£2(d)
Master psu	£59(b)
Master Keyboard	£62(b)
Keyboard Connector set (M)	£5(d)
1Mb OS ROM M	£39(d)
CF30060 ULA (M)	£10(d)
CF30047 ULA	£15(d)
ULA (512)	£34(d)
ULA (6502 & Z80 2nd Proc)	£28(d)
Power Supply (2nd Proc)	£42(b)
ARC Keyboard Assy	£85(b)
Arc Power Supply	£65(b)
Mouse	£49(c)
Drive Cable	£5(d)
Keyboard Curly Cable	£22(c)
Window Moulding	£6(d)
41464	£8(d)

If the parts you need are not listed above please call us)

MISCELLANEOUS

Single Drive Case (no psu)	£10(d)
Dual Drive Case (inc cable/psu)	£42(b)
Plinth Case (inc cable/psu)	£75(d)
Drive Data Cable Single £5(d) Dual	£6(d)
Drive Power Cable Single £3(d) Dual	£4(d)
Econet Cable 5pin DIN/5 pin DIN	£3(d)
ROM Extraction Tool	£2(d)

EPROM ERASER

UVI Eraser: Compact eraser in smart case, can erase six eprom at a time. Safety cut out switch ensures no exposure to UV rays when the carrier tray is drawn out. **£47(c)**

UVIT Easer: As above but with a built-in timer so that you do not have to worry about over exposure and damaging the eproms. **£59(c)**

BBC PUBLICATIONS EDUCATIONAL SOFTWARE

PRIMARY EDUCATION

Astronomy	£8(d)
Computers At Work Aud/Disc	£16(c)
Picture Craft	£17(d)
Introducing Geography	£15(d)
The Hall of Mirrors	£13(d)
Geordie Racer	£12(d)
Bird Spy	£8(d)
Maths Aud/Disc	£12(d)

SECONDARY LEARNING

Technology & Design Pt 1	£21.50(c)
Electric Fields	£8(d)
'A' Level Statistics	£19(d)
'A' Level Geography	£13(d)
Inside Information Prog/Cass	£10(d)
Book £8(d) Aud	£5(d)
Open Learning Pack D/Aud/Bk	£36(b)
Science Topic (ST): WAVES	£7(d)
ST: RELATIONSHIPS	£7(d)
ST: BONDING	£7(d)
ST: ElecMag. Spectrum	£7(d)
ST: Electronic in Action	£7(d)
ST: Newton & The Shuttle	£9(d)
ST: ECOLOGY	£9(d)
ST: POLYMERS	£9(d)
ST: Classif. & Periodic Tab	£10(d)
ST: Food & Population	£10(d)
Sec Science (SS) Microtech	£7(d)
SS: Mole Concept Disc/Aud	£10(d)

GENERAL

Vu-Type	£7.50(d)
Vu-Type Professional	£19(d)
White Knight Mk II	£16(d)
(pse specify Compact or 1770DFS)	
Battlefields Cass	£5(d)
Espana Viva Disc	£19(d)
Book £6.95(d) Disc/Aud (2)	£7(d)
Black Queen (1770DFS)	£13(d)
Bismark (1770DFS)	£13(d)

Codes: **Cass:** Program on Cassette. **Aud:** Audio Cassette. **Disc or no Code:** Program on disc
Above Programs are suitable for BBC B, B+ & Master

All software in this advertisement has been tested to work with appropriate Acorn Disc Filing Systems only and we are unable to comment on compatibility with any other filing system. It will be the buyers responsibility to verify such compatibility.

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technoCAD

COMPUTER AIDED DRAUGHTING FOR THE BBC MASTER



★ An easy to use CAD system with pop up menus providing a user friendly interface at all stages of operation.

★ Input can be configured for keyboard, mouse or tracker ball. Only three keys to input all commands if input from keyboard.

★ Virtually no limit to the size or complexity of the drawing that can be created. Powerful zoom facility allows a A0 size drawing to be viewed from single screen or a single screen can be enlarged to A0 size. Continuous panning across a drawing by specifying co-ordinates.

★ Lines, arcs and circles can be drawn with ease and in user defined colour and thickness. These can be modified at any stage of drawing.

★ User definable grid and scale, together with on screen display of dimensions, and co-ordinates enable easy and accurate drawings.

★ Multi layering capability with 8 levels allows superimposition of drawings.

★ Powerful icon utility allows any shape or drawing to be saved to a library as an icon. Icons can be recalled from the library and placed anywhere on the screen drawing at required scale and orientation.

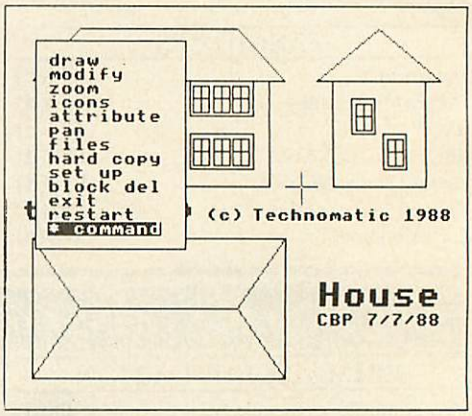
★ Toolkit program allows customisation of files, utilities and peripherals.

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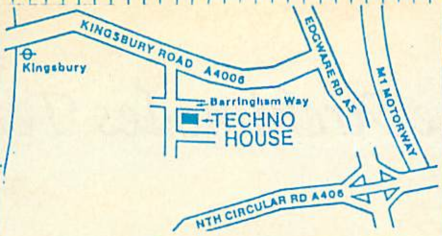
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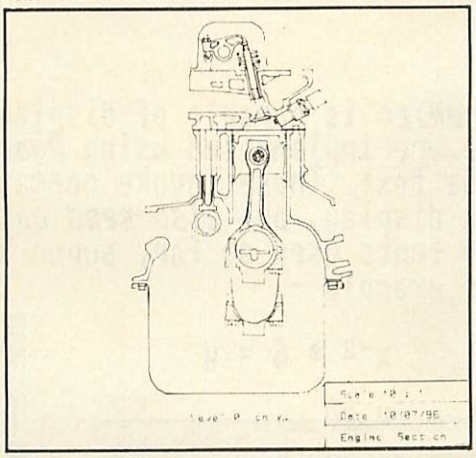
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Novacad is compatible with all models fitted with Acorn DFS. Hardware requirements can be minimum; single drive and FX80 compatible printer are enough to get started, though its performance is enhanced considerably by use of 6502 2nd processor, dual drive and to a degree with B+ and Master's shadow ram.

The major features offered are:

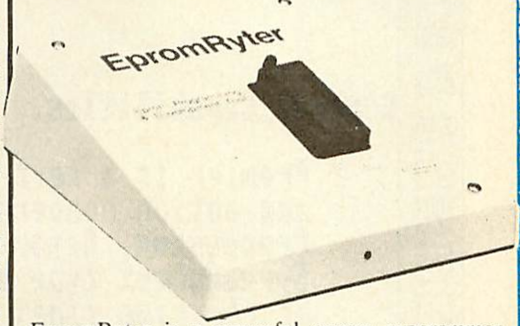
★ Simple and easy to use with logical command sequence.
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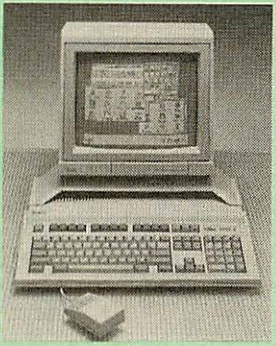
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Archimedes A3000



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P.S. This upgrade requires a backplane and a fan.

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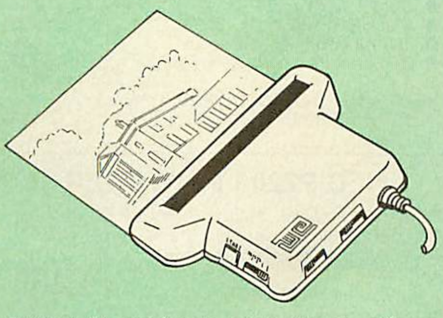
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NEW

Archie Hand Scanner



Watford Electronics is now able to offer a complete hand held scanning package, possibly the most essential addition to any desk top publishing system, for only £149. The package includes the most comprehensive utility software available for the Archimedes, a high quality hand held scanner, and all necessary documentation to get you going straight away.

The scanner is capable of scanning up to an amazing 400 dots per inch (DPI)! The scanning area is 4" wide, and the height is only limited by the maximum amount of memory available. The dot resolution may be switched to 100, 200, 300 or the maximum 400 dpi. One of four operating modes may be selected offering either pure monochrome scanning, or one of three grey level modes. The grey level modes use different size dither patterns to represent up to 16 shades of grey. There is also a dial to allow the "brightness" to be adjusted over a wide range, in order to optimise the quality for any specific image. The scanner interface is a standard, single width, expansion card (podule) which plugs into the Archimedes' backplane. The socket on the rear panel connects the scanner by 1.8 metres of cable.

SCANNER SOFTWARE

Full use is made of the windowing and the multi-tasking facilities of RiscOS. The software is supplied in a 64Kbyte ROM located on the interface board. The scanner appears as a small icon on the desktop icon bar, and the software is retrieved from the ROM simply by clicking on that icon. As you scan a page, the image appears in the scanning window on the screen, scrolling up in real time. The other facilities included in the software are.

Cropping and scalling to any size including stretching and squashing in X and Y directions separately.
Colour tinting.
X and Y flip.
Edge detection which turns solid objects into outlines.
Selective directional copying which allows features (i.e. lines or text) to be made thicker or thinner.

Scanned images may be saved as sprite files or transferred directly into other RiscOS applications (DTP, Draw, Paint) simply by dragging the sprite file into the application's window. Sprites may also be generated using anti-aliasing. This greatly improves picture quality and is particularly effective when scanning material with a range of grey tones, such as photographs. Images can be printed on any printer that is supported by a RiscOS printer driver, with optional settings for portrait or landscape modes, image scale and positioning. Images are printed using the full resolution of the printer and are not limited to the screen resolution.

On-screen help is provided via the RiscOS interactive help facility. Calls are also provided in the ROM for users wishing to write their own software, incorporating the use of the scanner.

£149

NEW

Archi Graphic Tablet

This package allows Archimedes users to take advantage of the excellent Aries low cost graphpad (sometimes called a digitiser tablet, but not to be confused with a video digitiser!)

The Archi Graphpad offers performance and accuracy comparable to other graphics tablets priced at well over £400, and has the useful addition of a liftable cover, which can hold tracing material or menu templates securely.

The software, which is in the form of a relocatable module (RM), intercepts the system calls which control the mouse, and so allows virtually all mouse based Archimedes software to be controlled using the tablet without any modification. The only exceptions are programs which use the serial port, as the tablet is physically connected to this post itself.

Graphics programs such as Artisan, Pro Artisan, AutoSketch, Oak DTP, and the RiscOS Draw, Paint and DTP packages are considerably enhanced by the use of the graphics tablet as opposed to the mouse, although it can, of course, be used with any other mouse driven application.

The software allows the user to define how much of the tablet's 12" x 12" working area to use, allowing very fine control when drawing freehand or tracing from a variety of differently sized drawings, diagrams, photographs, etc.

The tablet driver is compatible with all Archimedes machines, and with both Arthur and RiscOS operating systems.

The pointer is moved via a four button puck complete with transparent lens and crosshairs for optimum accuracy. Three of the buttons emulate the Archimedes mouse buttons precisely, the fourth being used for special functions such as setting the position and size of the active working area. The buttons may be re-mapped to allow the relationship between tablet and mouse buttons to be redefined, should this be required.

The software is supplied with a special adaptor lead to connect the tablet to the Archimedes' serial port, and a power lead which plugs onto the Archimedes' main board.

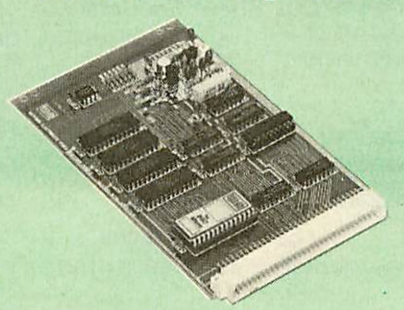
Launch Price £259
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Disc Drives DP35-800S



A Double disc drive – with a difference! Times are changing fast for the floppy disk, and whilst the current standard for the BBC B and Master Series is the 5.25 inch disk, the standard for the future will most certainly be the smaller; faster and more reliable 3.5 inch disks – now a standard feature of both the Master Compact and the Archimedes Series.

To support the present disc drive users, and cope with the future, we have designed our own plinth-mounted disk system – called the DP35 800S, it contains both the 5.25 inch and the 3.5 inch drive formats as well as offer a firm and rigid support for a monitor on top. With the BBC Micro underneath, the plinth makes a surprisingly small footprint on the desk – leaving you more space to work with.

The 5.25" disc drive is 40/80 track switchable. For ease of access, the switches are front mounted. DP35-800S has its own power supply, independent of the BBC Micro.

Watford's new plinth enables users to read, write and format disks both in DFS and ADFS format – currently the accepted standard for the Master Compact and the Archimedes, it also enables the user to read disks written for the Archimedes. Ideal for both BBC & Master.

Launch Offer: **£165** (carr. £7)

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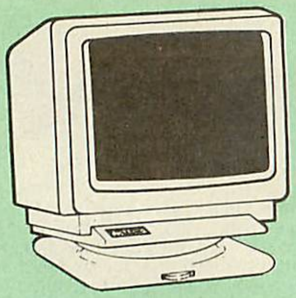
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- **CM8833** 14" Med. Res Colour Monitor £219

STAR BUY

- **PHILLIPS 14"** Medium Res, dark glass, attractively finished Colour Monitor – supplied complete with RGB, SKART and Audio/Phono Inputs. A push-button switch toggles between Hi-Res monochrome green text mode and full colour display. (Please state the type of Connecting Lead you require).

ONLY £199

Dust Cover for Phillips Monitors £6

SPARE LEADS

BNC Lead for Zenith or Philips £3
Skart Monitor Lead £5
RGB lead for TAXAN Monitors £3
Archimedes Colour Monitor Lead £7.50

SWIVEL BASES

By simply placing your monitor on one of our front adjustable professional swivel bases (see drawing at the top), you can easily adjust the monitor viewing angle.

for 12" Monitors **£8** (carr. £2.50)
for 14" Monitors **£12** (carr. £2.50)

Anti Glare VDU Screen

These extremely effective, easy to install, 12" & 14" VDU screens eliminate harmful glare, improves contrast on colour monitors. Increases productivity in offices. A must for wordprocessor users.

£12

PLOTTERS

- Plotmate A4S £379
- Plotmate A3M £549

Roland Plotters

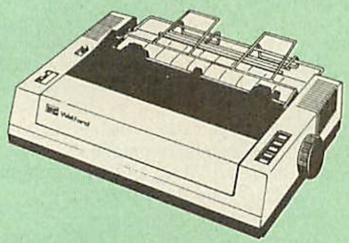
- **DXY 880A** £560
- **DXY 1100** £630
- **DXY 1200** £879
- **DXY 1300** £1035

TAXAN KP-815 PRINTER

Offer Price £155

Taxan KP915 132 Column **£275**
RS232 Interface £49
RS232 Interface with 2K Buffer £69
RS232 Interface with 16K Buffer £89

Panasonic KX-P1081



UK's most popular printer.

(Price inludes, FREE a 4ft Printer Lead, and a Dump Out 3, Screen Dump ROM worth £35 with every printer purchased from us).

SUMMER SALE OFFER only: **£135**
Optional RS232 Interface: £39

Panasonic Printers

- **KX-P1124** 24pin 80col. 192/63 £265
- **KX-P1180** 9pin 80col. 192/38 CPS £169
- **KX-P1540** 24pin 136col. 240/80 CPS £435
- **KX-P1592** 9pin 136col. 216/45 CPS £275
- **KX-P1595** 9pin 136col. 288/61 CPS £355

- **Panasonic KX-P4450** LASER PRINTER Latest technology at Watford's special offer price £1,499
- Spare Toner £29
- A4 Feeder £55
- Drum Unit £149
- Developer £115

Panasonic Accessories

Cut Sheet Feeders

KX-P1592/1595 (P32) **£175**; KX-P1540 (P35) £185
KX-P1124 (P36) **£88**; KX-P1180 (P37) £79

BUFFERS

P12 4K Buffer Board for 1081 £55
P42 32K Buffer Chip for 1592/1595 £49
P43 32K Buffer Chip for 1540/1124 £49

Serial Interfaces

P17 P1081/1592 **£32** P19 P1124/1180 £55

Original Panasonic Ribbons

Guaranteed to last 3 million characters
P110 for KX-P1081; 1592 & 1595 £8
P115 for KX-P1180 **£8** P145 for KX-P1124 £8
P140 for KX-P1540 **£10**

INTEGREX COLOUR JET

- Colour Jet 132 Printer £515
- Paper Roll £6.50
- Screen Dump Software £10
- Colour Cartridge £16.50
- Black Cartridge £10.35
- 100 A4 OHP transparencies £55
- 8K Serial Interface Optional £123

NEW – Intergrex COLOURCEL NPQ Ink Jet Colour Printer **£2,695**

NEC P2200 PINWRITER

24 pin; 80 column; 168CPS – 56CPS LQ; Epson LQ compatible, 7K Buffer; 7 resident FONTS, Friction & Tractor feed, front load single sheet feed, etc. **£269**

Pinwriter Serial Interface (optional) £55
P2200 Cut Sheet Feeder £59
Additional Font Cartridge £25
NEC P2200 Pinwriter Ribbon £6

NEC PINWRITER P6/P7 Plus

NEC P6+ 80 columns **£439** **NEC P7+** 136 columns **£575**
Colour Option **£74** Serial Interface **£73**
Cut Sheet Feeder **£125**
NEC Ribbons for P6 **£8**; P7 **£9.50**

Star Printers

Star LC10	**£169**	LC10 Colour	**£215**
Star LC24-10	**£279**	NB24-10	**£449**
LC10 Colour Ribbon	**£6**	Cut Sheet Feeder	**£65**

Brother HR20 DaisyWheel Printer **£339**

EPSON PRINTERS

EX800	**£410**	LQ860	**£539**
EX1000	**£564**	LQ1050	**£570**
FX850	**£315**	LQ1060	**£679**
FX1000	**£425**	LQ2550	**£925**
FX1050	**£439**	LQ2500+	**£839**
LQ500	**£275**	LX800	**£169**
GQ3500 Laser	**£1150**	SQ2500	**£975**
LQ850	**£430**		

CUT SHEET FEEDERS for

EX800 **£149**; FX800/LQ800 **£149**; FX850/LQ850 **£149**; FX1000/LQ1000 **£179**; LQ500/LX800 **£79**; LQ500 **£75**; LQ1050 **£175.**

TRACTOR FEED for

LQ800 **£44**; LQ850/FX850 **£69**; LQ1050/FX1050 **£85**; LQ2500 **£90**; LQ2550 **£90**

ACCESSORIES

- EX800/1000 Colour Option £55
- EX800/1000 Colour Ribbon £18
- LQ2500 Colour Option £65

(Securicor Carriage on Printers £7

EPSON PRINTER INTERFACES

All these interfaces fit inside the printer.

RS232	**£32**	RS232 + 2K Buffer	**£52**
IEEE 488	**£40**	RS232 + 8K Buffer	**£79**

PRINTER LEADS

BBC Centronics 4' long £5
BBC Centronics 6' extra long £7
Compact's Special Centronics Lead £7
Archimedes Printer Lead 1 meter £6
Nimbus Centronics Lead £12
IBM Parallel Lead 1 meter £6
Double Ended 36 way Centronic Lead 4' £7
Double Ended 36 way Centronics Lead 6' £9
MSX Centronics Parallel Lead 4' £12
RS232 Leads (Various) P.O.A.

RS-232 GENDER CHANGERS

Male to Female **£4.95**
Male to Male **£4.95**
Female to Female **£4.95**
25 way Male to 9 way Female **£4.90**

Listing Paper (Perforated)

- 1,000 Sheets 9½" × 11" Fanfold Paper £7
- 2,000 Sheets 9½" × 11" Fanfold Paper £12
- 1000 Sheets 9½" × 11" NCR 2 Part Fanfold £19
- 1,000 Sheets 15" × 11" Fanfold Paper £9
- 1000 Sheets true A4 Fanfold Paper 70gms £11
- 2000 Sheets true A4 Fanfold Paper 70gms £19
- Teleprinter Roll (Econo paper) £4

(All our Fanfold paper is Micro perforated leaving a smooth clean edge when the tractor feed strips are detached).

Carriage 1K Sheets £2.50. 2K Sheets £3.00

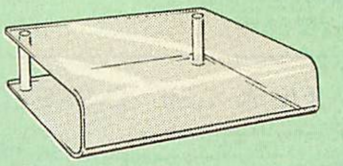
PRINTER LABELS

(On continuous fanfold backing sheet)

1,000	90 × 36mm (Single Row)	£5.00
1,000	90 × 36mm (Twin Row)	£4.90
1,000	90 × 49mm (Twin Row)	£7.50
1,000	102 × 36mm (Twin Row)	£6.25

Carriage on 1,000 Labels £1.00

Perspex Printer Stand



Give your Computer System a touch of Class with our elegant, smoke finished Perspex Printer stand. The printer sits on top and the fanfold paper rests neatly underneath, thus occupying the same space as the printer footprint.

Only: £16 (carr. £3)

Professional Printer Stand



This new professional printer stand takes hardly more space than your printer. Due to the positioning of the paper feed and re-fold compartments ie. one above the other, the desk space required for your printer functions is effectively halved. Additional facilities include: Easy access to paper from both sides, used with both top and bottom feed paper and with its dial controlled paper feed system with adjustable deflector plates it ensures smooth paper flow and automatic refolding.

***80 Column version £16** (carr. £3)*
***132 Column version £16** (carr. £4)*

PRINTER RIBBONS & VARIOUS DUST COVERS

Type	Ribbons	Dust Covers
Brother HR15/20	£3.00	–
BBC Micro	–	£3.50
BBC Master	–	£4.00
Archimedes Micro pair	–	£9.00
IBM PCs pair	–	£6.00
RX/FX80/MX80	£3.00	
DMP2000	£3.75	£4.75
EX/LQ800	£4.50	£4.50
EX/LQ1000	£7.50	£5.00
RX/FX80/85/800/MX80	£3.90	–
RX/FX100/1000	£5.75	–
Kaga/Taxan KP810/815	£4.90	£4.00
LC10 (Black)	£4.25	£5.00
LQ500/800	£3.75	£5.00
LQ1050/LQ2500	£8.50	£5.50
LX80/86/800	£3.80	£4.50
M1009/GLP	£3.80	£3.75
Panasonic KX1080/81	£4.00	£4.75
SQ2500	£23.00	£5.50
Star NL10	£3.75	£4.50
Olivetti Ink Jet Cartridges (set of 4)	£9	

Our attractive Dust Covers are manufactured from translucent PVC. The seams are stitched and edges are taped to prevent splitting due to continuous use.

Universal Printer Sharers/Changers

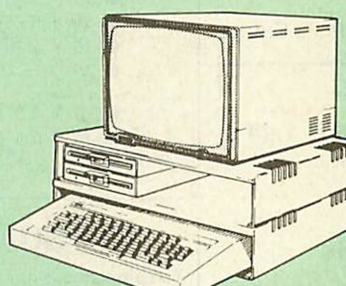
Connect upto 5 Micros to 1 printer or 5 Printers to 1 Micro with our combined, Sharer/Changer. These Units are made to a very high standard. For extreme reliability, they all have Printed Circuit Boards mounted inside the case, (not a Spagetti Junction of wires). Internal connection is made via high quality ribbon cables.

(Ideal for School environments.)

Connects	Serial	Centronics
2 to 1	£20	£22
3 to 1	£27	£30
5 to 1	£36	£39

(Cables extra at £6 each. Please specify type required when ordering)

PLINTHS FOR BBC MICRO, MASTER & PRINTERS



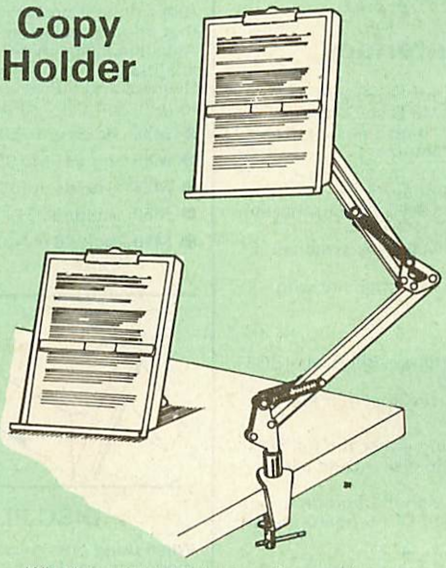
Protect your computer from the heat of your VDU. Our micro plinths have slots for maximum ventilation. The single plinth is suitable for a BBC and VDU, whilst the double height version provides enough room for our stacked disc drive and other peripherals like, Eprom programmer, music unit or simply discs & stationary. The computer slides neatly in the lower section allowing easy access to remove the lid.

The single printer stand is equally sturdy but instead of cooling slots it has elegant cutouts on the sides. This allows easy access to paper from all sides. Colour: BBC Beige.

Single BBC Plinth	420 x 310 x 105mm	**£12**
Double BBC Plinth	420 x 310 x 210mm	**£20**
Printer Plinth	420 x 310 x 105mm	**£12**
Single Master Plinth	490 x 310 x 105mm	**£13**
Double Master Plinth	490 x 310 x 210mm	**£24**

(Carr. Single plinth 12; double plinth £3)

Copy Holder



Whether you want to type in your latest program or the draft of a new trilogy, Watford's manuscript holders are superb for holding your paper at the ideal height and angle to allow you to read and type in ease and comfort.

Available in 2 full A4 versions, desk resting and shelf clamping. Paper is held firmly by means of a plastic retaining ruler and a clip grip. (for resting books or magazines, the desk top version is recommended).

Desk Top **£7** (carr. £3)
Angle poise **£12** (carr. £3)

NEW

Handy 2 Way Printer Switch

A handy two way compact printer-switch that enables you to connect 2 Micros to 1 printer, or 2 printers to 1 Micro. Attaches easily to your printer, monitor, etc. A low cost solution for educational establishments. Ideal for those wishing to use a dot matrix and a laser printer. Available in two configurations.

Compact AB Switch Centronics **£20**
Compact AB Switch RS232 **£19**
(Cables extra at £6 each)

MEGABUFFER 256



The Smallest 256K Printer Buffer Unit in the world **38mm x 130mm x 134mm.**

This new Megabuffer 256 from Watford is a full featured 256K Printer Buffer. The features are:

- Improves efficiency by making more efficient use of computer and printer.
- Compatible with any computer and printer that uses Centronics Parallel connections including all BBCs, IBM PCs, etc.
- Total compatibility with all software.
- Cheaper phone bills when using your Modems.
- Ideal for those doing large graphics screen dumps that are slow to print.
- Multi-Copy facility allows you to print several copies via Megabuffer without going through your computer.
- Data Dump facility is included.
- Built in test unit for both the buffer & your printer.

Only £149 (carr £5)

THE EPSON RX-FX-KAGA PRINTER COMMANDS REVEALED

So you bought yourself a new printer, because the salesman in the shop showed you how clever it is and impressed you with all sorts of printouts to show its capabilities – he may even have offered you a special price.

However, now that you have got it home and connected it to your BBC microcomputer, you are wondering how to make it perform these magical tasks. The manual seems to give no clues, and when you type in the example programs, the computer throws the LPRINT statements back in your face.

Now what do you do, when this £400 piece of high technology refuses even to move its head, and you have stayed up until 2 in the morning with copious supplies of coffee, desperately trying to print something out. Once again, Watford Electronics comes to your help with our new book entitled 'THE EPSON FX-KAGA PRINTER COMMANDS REVEALED'.

This book describes in plain, easy to understand English, how to use and make the most of your KP810, PW1080A or any other Epson FX80 compatible Printers like Panasonic KX-P1080/1, etc., with the BBC Micro, both from BASIC and Wordwise.

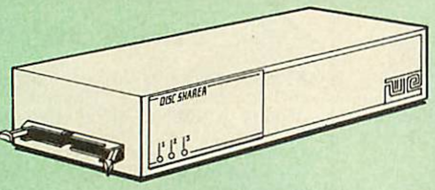
It describes in detail how to obtain the maximum in graphics capability from your printer and includes full indexes allowing you to cross index the numerous commands. Every command is explained in detail, with an accompanying BBC Basic program and an example of its use from Wordwise.

£5.95 (No VAT)

CREDIT CARD 24 HOUR Ansaphone Hot Lines (0923) 50234 or 33383

Continued →

DISC DRIVE SHARER



(Ideal for educational establishments)

At last, a low cost alternative to the Econet system. Watford's Intelligent Disc Drive Sharer allows you to connect 3 BBC micros (model B, B+ and Master series) to a single or double disc drive. Running under any DFS or DDFS, this intelligent unit will automatically queue the computers. Each computer has a status light dedicated to it. If it is green you will get immediate access to the disk, and red means that you are next in line. The unit plugs directly into the disc drive socket on each computer and is powered by the mains. (N.B. Not for use with ADFS.)

Launch Price: **£65** Price includes 3 Cables

NOW WITH EXTRA FEATURES AT NO EXTRA COST – Watford's latest DFS 1.44

- Incorporates Acorn's Official Tube Host Code so that those with 2nd processors no longer need to waste a ROM socket on the DNFS.
- Option to DOUBLE the speed of BPUT and BGET.

WATFORD's & ACORN's DFSs

Watford's popular and widely acclaimed DFS has now been available for six years and has gained a large following amongst serious and educational users of the BBC Micro. Owners of Acorn or any other standard DFS can upgrade to our "Ultimate" DFS merely by replacing their DFS ROM. See below for this upgrade. ***(P.S. Watford's highly sophisticated DFS is fully compatible with Acorn standard DFS). (while Acorn's 1770 DFS is fully compatible with Watford's Mk II DDFS)***

- *Watford's sophisticated DFS ROM only* **£16**
- *We will exchange your existing DFS ROM for Watford's Ultimate DFS ROM for only* **£12**
- *DFS Manual (Comprehensive)* *(no VAT)* **£6.95**
- *DNFS ROM only* **£17**
- *ADFS ROM only* **£25**

(P.S. Our DFS manual is the only comprehensive Manual available for the BBC micro and covers both Acorn & Watford DFSs).

(The Single Density DFS system is now old technology. Like Acorn, Watford too have decided to replace it with their more up-to-date 1770 DDFS interface. We have informed most of the software houses of this decision in order that they can ensure compatibility with our highly sophisticated and fully Acorn compatible DDFS).

NEW

Watford's MkII 1770

Double Density DFS Interface

Many of our customers have wanted to use our superior DDFS and Acorn ADFS together. Now our Mk II DDFS Board with its 1770 Disc Controller, has been adapted to allow the use of Acorn ADFS as well. It also has all the commands of the Acorn's 1770 DFS, plus the added features:

Added features include:

- Acorn ADFS compatible – Use ADFS on our DDFS board.
- Tube host Code – No longer any need to have the DNFS in your machine to use Co-Processors, even the CoPro and Master 512.
- Auto 40-80 Track sensing – no need to fuss with 40/80 track switches (even works with protected disks).
- An extremely powerful 8271 emulation – ensuring compatibility with almost all software.
- New low profile – small footprint board.
- Fits with all third party ROM boards.
- Option to double the speed of file handling operations – BPUT and BGET.
- Operates in both single and double density modes.
- OSGBPB has been recoded, increasing still further the speed of file handling.

Please note that not all DDFS's are capable of providing either the full 80% storage increase or of allowing a file the full size of the disk – Ours allows both of these!

If you already have a DDFS (any manufacturer), and wish to upgrade to our MkII version, then simply return your existing ROM and DDFS board and we will supply the new DDFS for only **£30.00**.

- Special introductory offer **£39.00**
- DDFS Manual (No VAT) **£6.95**
- We will exchange your existing DFS Kit for our sophisticated DDFS for only **£25.00**

Please note, as the MkII DDFS is a hardware and software upgrade, it is not possible for existing Watford DDFS users to simply exchange their ROM for the new version.

DUST COVERS (For our Disc Drives)

Single CLS (without PSU) **£3.20** Twin CLD (without PSU) **£3.85**
Single CS (with PSU) **£3.95** Twin CD (with PSU) **£3.90**

Mysteries of Disc Drives & DFS Revealed

Are you tired of faulty cassettes, and lengthy loading times? Do you want to upgrade your BBC micro to take discs but you get tied up in the plethora of jargon surrounding the choice and use of these systems.

Then The Mysteries of Disc Drives and DFS Revealed is the book for you. It explains in detail the different types of systems available, how they are installed and how to use them. Many examples are given including pre-written programs to call various functions of the DFS available only through Operating System calls. Different types of disc, 40/80 tracks etc. are all explained. This book is ideal for the beginner confused by the plethora of choice available in the marketplace.

£5.95 (Book No VAT)

3M – DISKETTES

3M – SCOTCH Diskettes with Lifetime warranty from Watford Electronics your 3M Appointed Distributor.

- *10 × 5.25" S/S D/D 40 Track Diskettes (744)* ***£6.00***
- *10 × 5.25" D/S D/D 40 Track Diskettes (745)* ***£7.00***
- *10 × 5.25" S/S D/D 80 Track Diskettes (746)* ***£11.50***
- *10 × 5.25" D/S D/D 80 Track Diskettes (747)* ***£11.00***
- *10 × 5.25" 1.6M D/S D/D High Density Discs for IBM XT and AT* ***£16***
- *10 × 3.5" S/S D/D 40/80 track Discs* ***£10.00***
- *10 × 3.5" D/S D/D 40/80 track Discs* ***£11.75***
- *10 × 3.5" High Density Diskettes* ***£25***

TOP QUALITY 3.5" & 5.25" DISKETTES

To complement our range of Quality Discs and Disc Drives, WE are now supplying SPECIAL OFFER packs of 10 Lifetime guaranteed discs. Each disc has a reinforced hub ring. Supplied complete with selfstick labels and a Plastic Library Disc Box.

- *10 × **M3** 3.5" D/S D/D 80 Track Discs* ***£10***
- *10 × **M9** 3.5" Double Side High Density* ***£25***
- *10 × **M4** 5.25" S/S D/D 40 Track Discs* ***£5***
- *10 × **M5** 5.25" D/S D/D 40 Track Discs* ***£7***
- *10 × **M7** 5.25" D/S D/D 80 Track Discs* ***£9***
- *10 × **M8** 5.25" D/S H/D Hi-Density Discs* ***£14***
- *3" Double Sided Discs* ***£2.50** each*

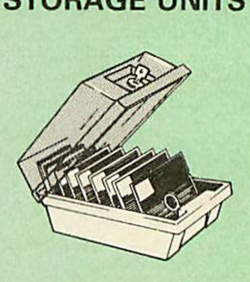
FLOPPY HEAD CLEANER KIT

The heads in floppy drives are precision made and very sensitive to dirt. The use of a cleaner Kit is a sensible precaution against losing valuable data. It is recommended to clean the drive head once a week. It is very simple to use. Available in 3½" & 5¼", please specify.

£4

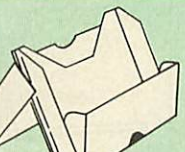
ANTISTATIC LOCKABLE DISC STORAGE UNITS

Gives double protection – Strong plastic case that affords real protection to your discs. Antistatic helps avoid data corruption whilst in storage. The smoked top locks down. Dividers and adhesive title strips are supplied for efficient filing of discs.



- **M35** - holds upto 50 5¼" discs **£4.95**
- **M85** – holds upto 95 5¼" discs **£6.95**
- **M25*** – holds upto 25 3 ½" Discs **£4.95**
- **M50** – holds 50 3½" Discs **£6.50**
- **M10** – holds 8 of No. 10 Data Cartridges **£15**

* Not lockable



PLASTIC LIBRARY CASES

Holds up to 10 5¼" Discs. **Only £2.00**

DISC PLONKER RACK



When using ones micro, there is a tendancy to have more than one Disc on the desk. This exposes them to the hazards of fingerprints, scratches, dust, coffee and an untidy desk.

Why not protect your valuable data from all these hazards with the help of our extremely handy and low cost DISC PLONKER RACK. Holds upto eight 5¼" discs.

Protection at Only: **£2**

DISC ALBUMS

Attractively finished in black leather look vinyl. Stores upto 20 Discs. Each disc can be seen through the clear view pocket.

£4

Quality Disc Drives from Watford

To help you decide which drive is the most suitable for your needs (and your pocket!), we have produced the table below.

The first capacity given in the first column indicates capacity in single density mode. That within the brackets is the capacity in double density mode. All disc drive type numbers start with the prefix "C".

The tinting on some of the boxes is used to indicate which Drives are 40 track (non-tinted) and which are 80 track (tinted). All our 80 track drives are already fitted with a 40-80 select switch.

***All our Disc Drives are Double Sided and will operate in both Single and Double Density modes.** Extensive experience of the usage of disc drives suggests that the JAPANESE drives currently represent about the best in terms of speed, reliability and overall "elegance" available for the BBC Micro.*

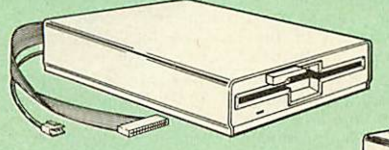
Various UK "manufacturers" of disc drives for the BBC micro (more accurately, "packages" label other manufacturers drives with their own name). We buy the high quality NEC and Mitsubishi drives in large quantities directly from the manufacturers, package them and sell them at "dealer" prices direct to the public.

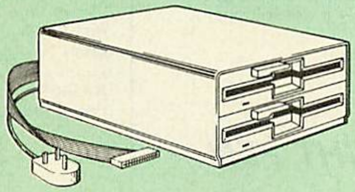
If you look around the popular BBC micro press, you will find that the prices we quote for the top quality, new slimline disc drives are, virtually without exception, some of the best around. These prices, coupled with the backup of one of the country's largest distributors of BBC peripherals provides a superb deal.

Unless you anticipate using dual drives in a fully expanded BBC system for long periods of time with little ventilation, then we suggest that our range of "CL" disc drives without the PSU (Power Supply Unit) would be quite adequate (extensive tests within our workshops have confirmed this). All drives are supplied complete with a SPECIAL UTILITIES Disc, Cables and Plugs. The Drives with power supply have a mains moulded plug for safety purposes. Ideal for Schools & Colleges. We are now able to supply all single disc drives with Power Supply, in either single or dual case. (Dual case has a twin data cable and a power supply capable of driving two disc drives) allows easy expansion to a dual drive unit, at a later date. Prices stated in the pricing boxes below are for single drives in standard single cases. Single drives in a dual case cost an extra £10. (At Watford we anticipate your needs of tomorrow, not just today)!

When using a BBC Micro, most people find themselves short of desk space. The Watford's BBC Micro plinths form an ideal way of recovering some of this precious space) your BBC, Disc Drive and Monitor can all occupy the same vertical footprint and still be comfortably situated. With the Watford Double plinth, your Disc Drive is mounted vertically at one side, leaving a very valuable area directly in front of you for such useful items as spare discs, pen, paper, reference manuals, etc. Follow the trend with Watford plinth. (Turn to the 4th page of our advert for the Plinths).
P.S. All our 5¼" Disc Drives with PSU are compatible with the Compact Micro. All you require is the special Compact Disc Drive Cables designed by us.

Our Disc Drives conform to BS415





"Test Bureau Approved for Use in Education"

Capacity	Drives without P.S.U.		Drives with P.S.U.	
	Single	Twin	Single	Twin
400K (720K)	CLS400S £75	CLD 400 £168	CS 400S £85	CD400 £188
800K (1.44M)		CLD 800S £153		CD 800S £163

● TWIN Disc Drive Case, complete with Power Supply & Cables **£43**
Securicor carriage on Disc Drives £5 to £6

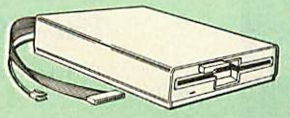
*Prefix **C** = Cased Drive*
***L** = Less PSU*
***S** = Single*
***D** = Double*

*Suffix **S** = 40-80 Switchable*

e.g. CLS400S = Cased Disc Drive, Less power supply unit, single 5¼" 400K, (720K in double density); Double sided; 40/80 track switchable.

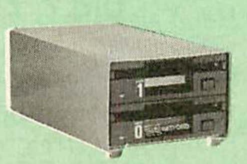
Cable to connect 5¼" Disc Drives to BBC Compact
Single £9 Twin £12
Special Cable to connect both 3½" and 5¼" Disc Drives simultaneously to the BBC Compact £13

Special 40/80 Disc Drive/DDFS Mk II Offer



- The popular 40/80 track 400K single Disc Drive, Double Sided, cased with Cables. Plugs directly to your Micro.
- Watford's extremely popular DDFS Disc Interface (allows 720K storage). Will run in both, Single & Double Density modes.
- A comprehensive User Friendly Manual.

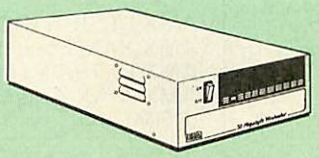
A Bargain at Only **£119** (£7 carr) (Offer valid while stocks last)



3½" DISC DRIVE OFFER

These top quality 3½" Double sided, 80 track, 1 Megabyte (unformatted each Disc Drives), are attractively finished in BBC beige. They are supplied complete with all cables and a Utilities Disc. They run directly from the BBC B/Master's own PSU.

- **CLS35 400K Unit £69**
- **CLD35 800K Unit £125**



WATFORD's WINCHESTER DRIVES

Undoubtedly the best value for money Winchester Hard disc available anywhere for the BBC Micro.

This 30 Megabyte hard disc is completely compatible with the Acorn ADFS – that's why we have bundled it with each Winchester drive, along with a Utilities Disc.

Finished in rugged metal and fetching BBC beige, the Winchester has an internal fan, so quiet you won't even hear it! A switched mode power supply and a neon-lit on/off switch are there along with a light on the hard disc to tell you when it is working – just compare the price with our competitors' 20 or 28 Mbyte discs!

Compatible with the Master, and the BBc B (with 17 X disc interface).

- 30 Megabyte BBC Hard Disc **£405** (carr £9)

Special BULK OFFER on 5¼" DISCS

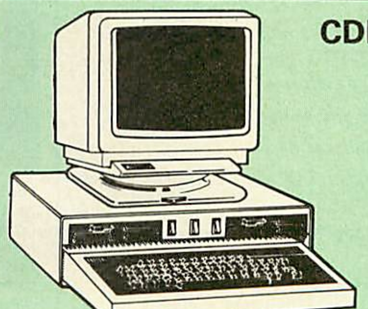


(Supplied packed in Anti-Static Lockable Storage Units)
(Lifetime warranty on Discs)

BULK PACK DISCS in lots of 100

Type	S-S 40T	D-S 40T	D-S 80T
● Without Sleeves	£35	£39	£45
● With Sleeves	£38	£42	£48

DP35-800S **CDPM800S**



Twin 800K Double sided 40-80 track switchable disc drives mounted in an attractively finished Beige colour plinth for the BBC Micro. Supplied complete with integral power supply, cables and Utilities disc. The mains switch with neon On/Off light indicator, and the two 40/80 track switches are mounted on the front panel for ease of use.

CDPM 800S for the BBC & Master £182
DP35-800 for BBC/Master £165
(For DP35-800S spec. see Page 2 of our advert)
(Securicor Carr. £7)

(The above drive units are 2 Megabytes unformatted)

Continued →

QUEST MOUSE Mk II

- Quest Mouse II & Quest Paint — £58
- Quest Mouse II, Quest Paint, AMX Stop Press & Pagefont — £89
- Quest Mouse II only — £29
- Quest Paint Software only — £34
- Quest Font Disc — £15
- Quest Mouse Mat (Red or Blue or Green please specify) — £3
- Part Exchange your unreliable AMX Mouse for a Quest Mouse for only — £22
- GXR ROM for the BBC Micro — £22

(P.S. Quest Paint is not compatible with BBC Compact)

N.B.
1. Quest Paint supplied complete with Software in a 32K ROM, Comprehensive User Guide and a Utility Disc.
2. Quest Font Disc has 22 text FONTS for use within Quest Mouse.

ConQuest

Watford's Quest package is an extremely powerful and flexible drawing package, with very wide and unusual features. However, since its launch various suggestions for even more advanced & powerful facilities were received from the Quest users. ConQuest allows you these more advanced facilities, like, distortion of a cutout to any shape and a full font designer. If you also have a GXR ROM in your machine or you are using a BBC Master then ConQuest will take advantage of this to give ellipses at any angle, sectors and arcs, etc. Quest combined with ConQuest and Acornsoft GXR ROM make up THE MOST POWERFUL drawing packages available for the BBC range. Quest Paint is able to take advantage of almost any additions to your machine, such as Shadow or Sideways RAM. ConQuest takes this principal even further, by utilising the otherwise normally incompatible Sideways RAM facility by holding pictures in them.

Some of the features are:

- *Pick filenames off the screen for loading and saving.*
- *Rotate a cutout to any angle and Distort it to any four sided shape.*
- *Has Built in Font editor.*
- *Default brushes and patterns on startup.*
- *16 x 16 font available on start up.*
- *Ability to reset patterns, fonts and brushes to default at any time.*
- *ROM based enhanced Epson and compatible printer dump.*
- *ROM based enhanced extended picture routine.*
- *Ability to create and abort extended pictures.*
- *Improved disk access speed for extended pictures.*
- *User definable sideways RAM driver for incompatible sideways RAM systems.*
- *Ellipses at any angle on Master 128 (or B with GXR ROM).*

ConQuest ROM Package — £30
(Price includes software in ROM and a comprehensive Manual).
(Not Compatible with BBC Compact)

RB2 Marconi TRACKER BALL

RB2 (AMX/Quest compatible)	£45
RB2 including Quest Paint	£75

THE NEW Mk III AMX MOUSE

ONLY: £59 Inc. Super Art package
(carr £3)
(Please specify for BBC, Master or Compact)

MOUSE MAT	**£3**
AMX MOUSE ONLY	**£29**
AMX UTILITY Package	**£13**
AMX SUPERART Package	**£34**
AMX STOP PRESS – A Desktop publising software. Works with Keyboard, Joystick or a mouse	**£32**
PAGE-FONTS – Over 20 Fonts for use with AMX Pagemaker	**£13**
AMX DESIGN (ROM)	**£55**
AMX XAM Educational	**£15**
AMX EXTRA EXTRA	**£16**
AMX MAX A-gem of desktop (ROM)	**£15**

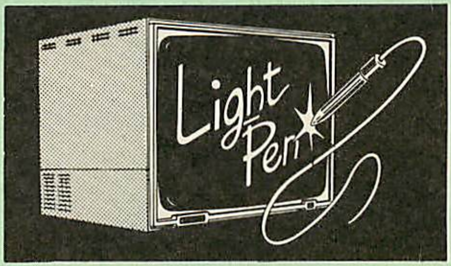
NEW

WE MOUSE HOUSE

Treat your mouse to a cosy Mouse House. This handy little gadget solves the problem of where to store your mouse when it is having a rest. Made of sturdy plastic, the WE Mouse House attaches to the side of your computer, Monitor, disc drive or desk.
It protects it from damage when not in use, yet within easy reach when you need it again. There is also a second compartment for your pens and pencils – and at £4 it doesn't cost a rodent's ransom.

Price £4

MARK II LIGHT PEN



Our Mark II Light Pen is the very latest in light pen technology. It is totally insensitive to local lighting conditions and works with many different monitors. The pen only responds to the High Frequency light produced by your monitor/TV. An LED indicates when valid video data is being produced. A conveniently located switch is also fitted.

Price Only £21

FLEET STREET EDITOR

Software pack for BBC Micro	**£33**
Software pack for the Master	**£39**
Software Pack for Compact	**£40**
Admin Xtra Disc Utility	**£13**
Walt Disney Disc Utility	**£13**
Fonts N Graphics Disc Utility	**£13**

BEEB VIDEO DIGITISER



"Test Bureau Approved for Use in Education"

Using any source of composite video (colour or monochrome) and the Watford Beeb Video Digitiser, you can convert an image from your camera into a graphics screen on the BBC Micro.

This uses the full graphics capacity of the BBC micro in modes 0, 1 or 2. The video source may be a camera, video recorder or television, and is connected via the video output socket.

Images produced can be compressed, stored to disc, printed on an Epson compatible printer, directly used to generate graphics, analysed for scientific and educational use or converted to other formats e.g. Slow Scan TV or receiving a picture from a remote camera using a modem.

The output from the digitiser exactly matches the graphics capability in each mode, with up to 8 levels of grey in mode 2. The unit connects into the User Port and automatically scans a complete picture in 1.6 seconds.

Both the black and white levels can be adjusted manually for the optimum picture, or switched to automatic for unattended use. The image produced can be reversed if necessary.

Full controlling software is supplied on a normal sideways ROM and this is easily accessed via additional * commands. The package i designed to allow easy input of complex screens and give full access of the data to the user. Once on the screen, the image can be used as a normal graphics screen, allowing any of the usual graphics commands in BASIC or other ROMs to work on it.

A special print dump routine is included with the driver programs. This is specially designed to produce a fast, correctly proportioned picture, with reduced "contouring", resulting in an accurate reproduction of the original image.

Detailed examples of driving this unit from BASIC or other languages are all provided in the extensive manual supplied.

£109 (Carr. £5)

(Price includes) Digitiser Unit, Software in ROM & a Comprehensive Manual)
(BBC B+ and Master compatible, except Master with Econet)

Magazine Maker

(As seen on TV)

A combination of the Pagemaker and Watford's Beeb Video Digitiser.

Using any video that provides a composite signal and the digitiser, images from a camera or TV can be converted into a graphics screen on the BBC Micro.

They can then be used within Stop Press to illustrate magazines or newsletters – in fact anything that needs to be created on A4 size paper.

With Stop Press's many features, a variety of pictures can be composed – the only limit being the imagination.

Pictures can be doctored using Stop Press's graphics option to produce any number of effects.

Text can be formatted around the digitised photo on screen using the facilities available, which include 16 typefaces, character and pattern definer, text formatting and the ability to load in wordwise and viewfiles plus much more.

Once created the picture can be printed out.

The Magazine Maker is suitable for any use that requires illustrated documents.

Complete Package **£135.00** (carr. £3)



The WAPPING EDITOR

Watford Electronics bring professional quality Desktop Publishing to the Beeb. By using the latest PAL technology WE have managed to cram a whopping 64K of program onto a single chip. The Wapping Editor contains ALL the software you need to get into print fast, including a very sophisticated graphics module, professional quality typesetting software with features not found on any other package in its class, a word processor which has been especially written with the DTP environment in mind and a comprehensive font editor for designing your own typefaces and headlines. It will run on the BBC B, the B+ and the Master series of computers and will take full advantage of any sideways or shadow RAM that your machine may have. It will run under DFS, ADFS and Network filing systems and requires as a minimum just a single 40 track drive.

Included with the system is a utility disc containing several high quality fonts; extra patterns for use in the graphics module; print, preview and mode convert routines and a ROM image of a Support ROM which gives even more flexibility to an already outstanding package. Amongst the many features of the Support ROM is a *"Turbo DFS"*, which is automatically selected if the Support ROM is installed. This gives DFS access times comparable with those of ADFS. The Turbo DFS is compatible with all Acorn standard Disc Filing Systems but may be disabled if required by a simple * command.

PAGE LAYOUT SECTION

The Wapping Editor may be used to create pages of any size from an A6 to a full A3 page. If none of the eight default page types suit your purpose, the stand-alone page creation program, also supplied on the utility disc, may be used to create a page to your precise requirements, to tailor-make your own Letterheads, Invoices, Complements slips etc. Together with a choice of four different densities of print-out, from a quick draft to a super-dense high-resolution dump, it is obvious that this package has true flexibility. By using fully proportionally spaced fonts and genuine microspacing it is possible to print over 150 characters across an A4 page, giving a wholly professional look to your presentations. A unique feature of the Wapping Editor is the 'A5 x 2' page size, which if used with the 'rotated printout' option, allows two A5 pages to be printed side by side onto a single A4 sheet. This greatly simplifies the task of producing booklets, newsletters, manuals etc. since the double sheets need only be collated, stapled and folded in half.

The graphics module of the Wapping Editor is a mode 0 version of the highly acclaimed Quest Paint package, incorporating all the same drawing facilities, e.g. brush, airbrush, polygon, circle, fill, cut-and-paste, etc., except in two colours and with twice the horizontal resolution. The Support ROM contains routines to allow an area to be rotated to any angle or distorted to any four-sided shape. Also included are facilities to draw ellipses at any angle and sectors, segments and arcs (in Master or BBC B with Acorn GXR).

The typesetting section will allow for justified or unjustified text, in any size font to be printed anywhere on the page. You simply specify which text document and which font you wish to use, and pull out a rectangle on the page where you want the text to be – it's as simple as that! Multiple columns may be printed just as easily and a special 'expand' feature will expand the microspacing so that the document exactly fits the space defined.

WORD-PROCESSOR

The integral full-feature word processor is the ideal tool for producing your text documents, although text can of course be read in from any of the other popular word processors such as View, Wordwise etc. This means that anyone with a word processor can contribute documents for publication but that it is not necessary to have one in order to use this package.

THE FONT EDITOR

The font editor module is an enhanced version of the one in the ConQuest ROM (see elsewhere in our advertisement for details of ConQuest). It will allow you to design your own typefaces or to modify the ones provided on the utility disc. This sophisticated editor has numerous functions including slide, flip, invert and rotate individual characters or the whole font. Single characters may be mirrored and copied and a unique 'mask' feature allows two characters to be superimposed. Lines and columns may be added or subtracted permitting characters to be stretched or squashed. Each character may be individually proportionally spaced and characters of any size up to 16 x 16 pixels may be defined.

If you already have a DTP package for your micro you will be able to use any of your existing graphics or text files from within the Wapping Editor. Even your existing fonts may be used since the font editor will convert fonts from other packages, such as Quest Paint or Stop Press (formerly Pagemaker), into Wapping Editor format. The mode conversion facility will convert any screen in modes 1,2,4 or 5 into a full grey-scale mode 0 screen, allowing graphics produced using Quest Paint, and Artist or Super Art etc., to be incorporated into the Wapping Editor. Picture may also be 'grabbed' from a video source by using the Watford BEEB Video Digitiser, either independently or from within the Wapping Editor package.

If you've been wondering which DTP system to go for, or which to upgrade to, then wonder no more, this is it. Everything has been done to make life easy, with no need for specially formatted discs or separate discs for pages, fonts, pictures etc. All types of file may be stored on the same disc, with the software intelligently and transparently distinguishing between them. Filenames are picked off the screen with the mouse, despensing with keyboard entry wherever possible.

"The Wapping Editor combines sophistications with ease of use and power with simplicity, to make it the most comprehensive and user-friendly DTP system ever likely to be written for the Beeb".

Wapping Editor Software Pack	£69
Wapping Editor plus Mouse	£89

NEW

Wapping Font Disc

Sixteen Wapping Editor fonts including smaller versions of Oberon and Daisy and two new sizes of the standard font.
Also included are three Mode 0 screens containing giant 'headline' fonts to cut and paste to create extra smooth headlines.
Supplied complete with instructions. **£12**

NEW

Wapping Art Disc

Over 250K of clip art to cut and paste into your Wapping Editor pages. Pictures include maps, transport, people, media, sport, games, etc. Two 'ratio' screens for use with hi-res and rotated A5 pages to ensure images are not distorted when printed out.
Music writing symbols in the form of pattern and brush for quick production of manuscripts are included together with staves.
There are two prepared hi-res pages layed out for printing labels, both single and double width. Ready made label designs are included but these can be easily replaced with your own designs.
A Mode 0 screen dump routine is also included. To pack such a large amount of data onto the discs the screens have been compressed and routines to compress and expand Mode 0 screens are included on both discs. Using the packing routines you can archive large numbers of screens onto a single disc.

£15

The Beeb HandScan Watford's Hand-held Scanner for the BBC Micro

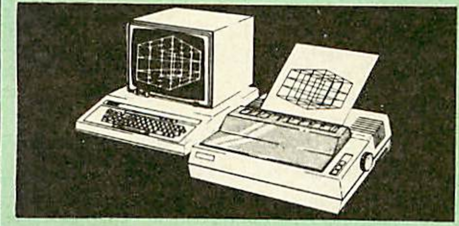
NEW



Watford Electronics are pleased to announce the launch of the first hand held scanner for the BBC Micro. HandScan is a compact unit which will allow photographs, diagrams, or any other documents to be digitised quickly and easily, to then be used in a desk top publishing package, art program, or even in your own Basic programs! These useful devices have been available for faster and more expensive micros for some time, but only now is Watford Electronics able to offer for the BBC Micro computer.
The HandScan plugs directly into the 1MHz bus on the BBC while a comprehensive set of utilitiesis provided by the sophisticated ROM firmware. The scanner has a resolution of either 100 DPI or 200 DPI when accuracy is essential. Pictures as wide as 4" may be scanned in mode 0 and various type of dithering may be selected to simulate the grey levels of a scanned picture. All necessary software has been included in the firmware to allow the scanner to read images directly into our Wapping Editor with little more than the click of the mouse. The digitised picture may then be incorporated into your magazine, newsletter, report or any other document.

Beeb HandScan & Firmware	£135

DUMPOUT 3



A highly sophisticated screen dump ROM. This has to be the most flexible and powerful screen dump ROM yet produced for the BBC micro. It will put on paper anything you see on the screen, including full Mode 7 graphics.
Also provided are window setting utilities and OSWORD calls to plot and read Mode 7 graphics pixels.

Facilities:

- Vertical and horizontal scaling in all graphics modes and mode 7
- Rotation of image by 90, 180 or 270 degrees
- Left hand margin setting
- Screen dump window setting
- Colours appear as grey scale
- Two tone fast dump
- Colour mask
- Mode 7 contrast expansion
- Mode 7 contiguous dump
- Key triggered and User Port triggered dumps

For use with the following printers:
GLP, GP80/100/250, CANNON, STAR, KAGA/TAXAN, NEC, SHINWA CP80, GEMINI, EPSON MX/RX/FX, M1009, NEC PC8023, DMP100/200/400, Panasonic KX1081/82, Mannesman Tally and compatibles.

Only: £25

Continued →

ARIES CORNER

B-32 Shadow RAM Card

Like the BBC B+, the B32 provides 20k of shadow screen RAM and 12k of sideways RAM. Unlike the B+, the B32 has simple software commands which allow the user to reconfigure the RAM as 16k of shadow RAM and 16k of sideways RAM, or all 32k as sideways RAM.

With the B32, the programmer gets up to 28k of RAM available for Basic, Logo, Comal, Forth, Lisp and BCPL programs in any screen mode. The business user gets extra memory -for View, 'ViewSheet, Wordwise Plus, Interword and many other applications. For advanced applications, the scientific user gets access to a massive 47k of data storage using the Acorn approved *FX call.

Sideways RAM enables you to load sideways ROM images from disc, allowing you to have a large library of sideways ROMs (subject to the copyright holder's permission) stored on disc. The B32's sideways RAM can also be used to extend any operating system buffer (such as the printer buffer) or to load tape programs into a disc system.

The B32 simply plugs into the 6502 processor socket on your BBC micro – no flying leads to connect and no soldering. Provision of the on-board ROM socket means that the Aries-B32 control ROM does not use up one of your existing ROM sockets.

- Recommended by Computer Concepts for use with their Inter series of ROMs.

Price: **£69** (carr. £2)

Aries B-12 Sideways ROM Board

The B12 provides a total of twelve sideways ROM sockets (the four in the original machine are replaced by the twelve on the board), all fully accessible by the MOS sideways ROM system. In addition, there are two sockets for sideways RAM, giving up to 16k of RAM using 6264 static RAM chips.

The B12 system consists of two parts: a large detachable "mother board" which carries the extension ROM sockets and a small "base board" on a short ribbon cable, which plugs into the existing sideways ROM sockets.

If you do not have a B32 or B20, a small adaptor module (the Aries-B12C) is available at a nominal cost.

Price:		
	Aries B-12	**£36**
	Aries B-12C	**£5**

ARIES B-488 IEEE-488 INTERFACE UNIT

The Aries-B488 is an interface unit to enable the BBC micro to control and monitor IEEE-488 bus systems. The IEEE-488 bus (also known as the 'GPIB' or 'HP-IB') is the standard method of interconnecting programmable laboratory instruments and control equipment. Using the B488, up to 15 devices may be connected in a single high-speed data network.

£238 (Carr £3)

VOLTMACE JOYSTICKS

Delta 3B Single Joystick	£10
Delta 3B Twin Joysticks	£15
Delta 3C Joystick for Compact	£10
Delta 14B Single Joystick	£11
Delta 14B/1 Adaptor Module	£12
Transfer Software Disc-Tape	£7

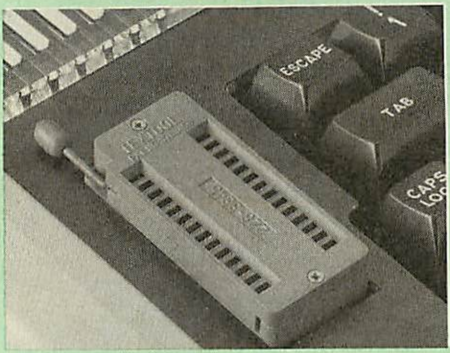
REPLICA 3

This new improved REPLICA 3 from Clares is a very powerful disc based TAPE to DISC Utility. It now transfers even more programs than ever before. Replica 3 will not work with all programs but then neither will anything else. 30,000 Replicas have been sold to date. It has to be good.

£15 (40 or 80 track)

Not compatible with 1770/DDFS.

SIDEWAYS ZIF SOCKET



Allows you to change your ROMs quickly and efficiently, without opening the lid. The ZERO INSERTION FORCE (ZIF) socket is located into the ROM Cartridge's position.

- Very simple to install. NO SOLDERING required. The ZIF (Zero Insertion Force) eliminates the possibility of damage to your ROM pins when inserting & extracting.
- The low profile of the socket allows unrestricted access to the Keyboard.
- All data and address lines are correctly terminated to ensure correct operation of suitable ROMs with the BBC micro. We also supply a purpose designed see-through storage container with anti-static lining, allowing you to store up to 12 ROMs, protecting them from mechanical and static damage.
- This versatile hardware solves the problem of running out of socket space. Simply lift the ROM from the ZIF & insert a different one (No pulling or pushing of Cartridges. It is a must for all professionals and Hobbyists alike.)
- BBC, B+ and Master compatible.

ONLY **£18** (carr £3)

Low Profile CARTRIDGE SYSTEM

Complete System consists of: Low profile ROM Cartridge, Socket housing, Cable assembly, 5 labels and a library storage rack for the BBC B.

● Complete System	**£11**
● Spare Cartridges	**£2.50**
● Spare Rack	**£1.50**

ROM Cartridges for the BBC Master
Twin **£8**; Quad **£12**

16K DISC RAM

(16K Sideways RAM Module)

Complete with such features as read and write protection, these new modules from Watford Electronics are ideal for the hobbyist, software developer and ROM collector.

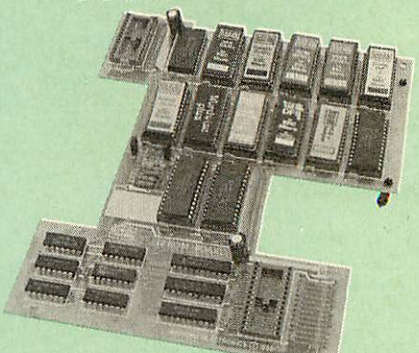
Key points to note about this new addition to the Watford range of products are:

- Write protection (useful in a variety of circumstances).
- Compact construction.
- Supplied complete with Battery Backup.
- No overheating or overloading problems.
- Free utilities disc supplied.
- Can be used as a 16K PRINTER BUFFER.
- Ideal for professional software development.
- Supplied with utilities software disc.

Only: **£35** (carr £2)

P.S. 16K Disc Ram Board is not designed to work in conjunction with a Sideways ROM Board.

SOLDERLESS SIDEWAYS ROM SOCKET BOARD



In the May 1986 Micro User's independent review, the writer concludes, "The board has been well laid out. Its position is much better than others – not over the HOT RAM chips and further away from the disc controller area". "I give the solderless ROM board the thumbs up and wish it success".

This brand new board from Watford Electronics is designed specifically for those wishing to add a ROM board to their own BBC without the need to perform any soldering.

This new board expands the total possible number of ROMs in a BBC from 4 to 16.

Unlike our competitors inferior boards, the ONLY upgrade required for fitting battery backup to the Watford Solderless ROM board (all Watford ROM boards, actually) is the fitting of the battery itself. (No other expensive components are required.)

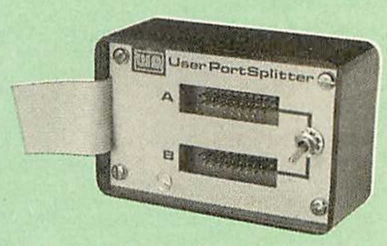
- The key features of this new, no fuss, easy to install quality product from BBC leaders Watford Electronics are as follows:
- Increase your BBCs capacity for ROMs from 4 to 16.
- **No soldering required.**
- Very low power consumption.
- Minimal space required.
- Compatible with Torch, DDFS, RAM Card, 2nd Processor, etc.
- Socket 14 takes two 6264 RAM chips.
- Read protect to make RAM "Vanish") allows recovery from ROM crashes.
- Battery backup option for RAM chips.
- Supplied ready to fit with comprehensive instructions.

Price: Only £35
Battery backup fitted **£39**
Battery Backup only **£3**
(carriage £2)

- Sideways RAM Utilities Disc for Solderless ROM Board. Includes the options to load and save ROM Images and the facility to use Sideways RAM as Printer Buffer.

Only: £8

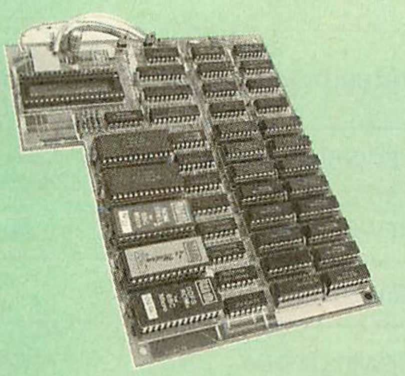
USER PORT SPLITTER UNIT



Gone are the days when you had to plug and unplug devices from the User Port. This extremely useful little device allows two units to be connected to the User Port simultaniously, and select between them simply by toggling a switch. This device is particularly useful for those people using Quest Mouse and the Watford Video Digitiser or any similar combination.

Excellent Value at **£22** (carr £2)

ROM/RAM CARD



Watford Electronics announced the first ever commercial ROM board for the BBC micro, the Watford Electronics 13 ROM Socket Board 3 years ago. Following the success of this board, we have designed what probably represents the ultimate in expansion boards, the new Watford Electronics ROM/RAM board. This highly versatile and sophisticated board represents the latest in "2nd generation" sideways ROM technology for the BBC micro, designed to satisfy the serious BBC user.

- NO SOLDERING required to fit the board.
- NO overheating problems.
- No User Port corruption (avoids problems with the mouse, modems, Eprom Programmers, etc.)
- Fully buffered for peace of mind.
- Firm mounting in BBC micro.
- Compatible with all BBC micros (not BBC+ or Master).
- Total number of ROMs increased from 4 to 8.
- Up to 8 banks of sideways RAM (dynamic).
- Option for 16k of Battery backed CMOS RAM (CMOS RAM needs one ROM socket).
- Software Write protect for ALL RAM.
- Read protect for CMOS RAM (ALLEVIATES crashes during ROM development).
- Separate RAM write register (&FF30 to &FF3F).
- Automatic write to currently selected RAM socket for convenience.
- Accepts any ROM.
- FREE utilities disc packed with software.
- Compatible with our DDFS board, 32k RAM Card, Delta Card, sideways ZIF, etc.
- Large printer buffer.
- UNIQUE Fully implemented RAM FILING SYSTEM (similar to the popular Watford DFS).
- ROM to RAM load and save facilities.

The SFS (Silicon Filing System) can utilise up to the full 128k of RAM (with the SFS in any paged RAM) as a SILICON DISC. This behaves as a disc drive, with all the normal Watford DFS features (including OSWORD &7F for ROM-SPELL, etc.) to provide an environment that looks like a disc but loads and saves MUCH faster.

The ROM-RAM Board plugs into the 6502 CPU socket. This leaves free all the existing ROM sockets, which can still be used normally.

Any ROM that can be plugged into the BBC micro's own ROM sockets may be used in the ROM-RAM Board.

The ROM-RAM Board is supplied with all ordered options fitted as standard. Upgrade kits (with full instructions) are available for all of the options, for later.

Please write in for further details.

INTRODUCTORY PRICES:

- ROM/RAM card with 32k dynamic RAM *£48*
- ROM/RAM card with 64k dynamic RAM *£65*
- ROM/RAM card with a massive 128k dynamic RAM £109

(carriage on ROM-RAM Card £3)

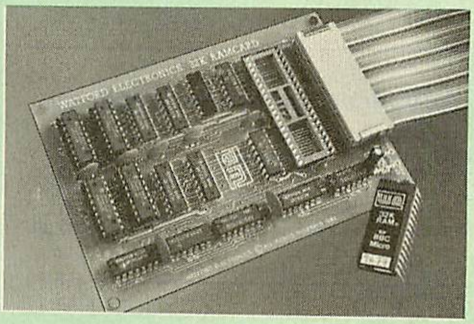
OPTIONAL EXTRAS:

- 16k plug-in Static RAM kit £17
- 16k Dynamic RAM for Upgrade £17.50
- Battery backup £3
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Complete ROM-RAM board
All options installed £115

P.S.
Is your existing ROM Board overflowing with ROMs? Do you need more Sideways RAM? Is your Board unreliable? Then upgrade to Watford ROM/RAM Board and pay £5 less

32K
SHADOW RAM-Printer Buffer
Expansion Board



A MUST FOR WORD PROCESSING

Watford Electronics now brings you the latest state-of-the-art MEMORY EXPANSION BOARD for your BBC microcomputer. Don't throw away your BBC B for a BBC B Plus or BBC Master. Just plug the ribbon cable into the 6502 processor socket, and fit the compact board inside the computer. Immediately you will gain not 16K or even 20K, but a massive 32K of extra RAM!!!

- IMPROVE your WORD PROCESSING system, whether disc or cassette based. Don't wait for a slow printer – type in text while printing. TWO JOBS DONE SIMULTANEOUSLY and £100+ saved on a printer buffer.

- "VIEW" Wordprocessor users can now type in letters in 80 columns and have up to 28,000 bytes free – 5 times as much as normal.

- In WORDWISE (or WORDWISE-PLUS), preview in 80 columns with the full 24K of text in memory. This product is recommended as an ideal complement by Computer Concepts.

- Combine GOOD GRAPHICS and LONG PROGRAMS. Use the top 20K of the expansion RAM as the screen display memory, leaving all the standard BBC RAM free for programs. Benefit from MODE 0/1/2 graphics and 28K of program space.

- Use the FULL 32K or the bottom 12K of the expansion RAM as a PRINTER buffer for PARALLEL or SERIAL printers, sound channels, RS423 etc. Print large text files while running long graphics programs, and have all your buffer options available as well (*FX15,21,138,145,ADVAL etc). Please note only a 12K printer buffer can be used with Wordwise or Wordwise-Plus, due to the way they are written.

- Unique facility to turn ROMs off and on again. Unlike all other ROM managers, this feature does not use 'unofficial' memory. Two bytes of normally user-inaccessible memory on the RAM card are used to ensure ROMs are disabled WHERE OTHER ROMS FAIL.

- Recommended by Computer Concepts for use with their Inter series of ROMs.

Only £59 (carr £2)
(Price includes a comprehensive manual and the ROM)

INCREDIBLE WORDPROCESSING DEAL

Watford's 32K SHADOW RAM CARD and Computer Concept's INTERWORD Wordprocessor package.

at Only **£89** (carr £2)

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The Watford Speech Synthesiser is a very flexible speech synthesis unit based upon the powerful phonemes system. This system stores the building blocks of speech (called phonemes) and allows you to combine them quickly and easily to form virtually any word imaginable.

Supplied with an advanced ROM, you are provided with a 500 word dictionary to get you started. These can easily be added to by following the notes given in the comprehensive manual.

SPECIAL PRICE £32 (carr £2)

Continued →

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ACCELERATOR	£30
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TERMI	£25
COMMUNICATOR	£49
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Wordwise plus £40

We are giving away absolutely **FREE,** the superb Word-Aid ROM worth £24, with every WORDWISE PLUS package bought from us.

Word-Aid

The most comprehensive utilities ROM for Wordwise-Plus

Extend the power of your Wordwise Plus word processor with this most advanced ROM from Watford. By utilising the powerful Wordwise Plus programming language, WordAid provides a whole host of extra features, all accessed via a special new menu option. This ROM has been personally approved by Mr Charles Moir, the author of WORDWISE PLUS.

- Alphabetical sorting of names and addresses.
- Text transfer options.
- Chapter marker.
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- Search and display in preview mode.
- Embedded command removal.
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- Multiple file options for print and preview.
- Address finder.
- Label printer.
- Mail-merger.
- Number/delete/renumber.
- Clear text-segment area.
- BBC B, B+ and Master compatible.

Only £24

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MINI OFFICE II

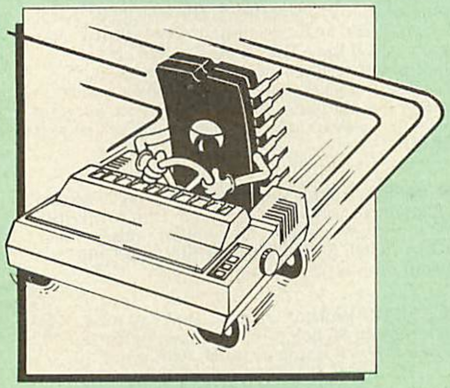
DISC Version for BBC B & B+	£14.00
DISC Version for BBC Master	£16.50
Disc Version for the Compact	£18.00

(When ordering please specify for which Micro & 40 or 80 track Disc).

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VIEW PRINTER DRIVER ROM



View is a powerful word processor, but until now has seriously lacked in terms of printer support. With the launch of our Printer Driver ROM, which includes an extremely powerful and easy to use Printer Driver Generator, View users can find themselves in the realms of advanced word processing only at a small outlay.

The VPD extends View's printer command with a series of mnemonic commands. All standard highlight sequences are also supported. A large range of printers are supported by drivers contained within the ROM (the drivers can be downloaded and customised). Printers supported include: Epson's MX, RX, FX, FX, LX, JX80 range, HI80, KP810/910, PW1080, JP101, HR15, M1009, GLP, Panasonic KX-P1081/2, JUKI 6100, etc.

Other printers are readily supported by defining a Printer Driver using the built in Printer Driver Generator. The features mentioned below are available to both the built in Printer Drivers and user defined drivers (assuming the printer supports the features).

NLQ control, Underline, Bold, Proportional Spacing, Microspacing, Italic, Superscript, Subscript, Condensed, Enlarged, Double Strike, Set lines per inch numerically (e.g. LPI 6), Set characters per inch numerically (e.g. CPI 5), Select printer font, Select printer ribbon colour, Translation sequences, Emulation of BBC Character Set, Simple numeric expressions for certain operations, Full printer setup, Send control codes, Print prompt on screen, Redefinable Pad character, Pause for key press, Prompt to change daisywheel, and Execute * command when printing.

Other features include a very powerful on screen preview, with bold, italic, underline, super/subscript, enlarged highlights, and a special printer driver to allow memory based text to be previewed by View 1.4. Of course, View 1.4, 2.1 and 3.0 are all supported, as is Shadow RAM and 6502 Second Processors. The BBC B series and Master series of micros are supported. A comprehensive manual is supplied. All in all, a very professional product for the discerning user who wants power at their finger tips. (Write in for a detailed leaflet).

Price: Only £33

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68000 User Guide	£8.95
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The Advanced Reference Manual for the BBC Master

At last Acorn's long awaited Advance Reference Manual for the BBC Master Series of Microcomputers has now been published. Watford Electronics' own authors have edited and added missing sections to the original script and produced a very high quality publication.

It features information about:

- Memory Organisation
- Slow data bus
- Detailed circuit description
- Keyboard controller
- Screen display
- User port
- Serial Processor
- Peripheral bus controller
- 1 Mhz Bus
- Machine operating System
- Second processors – Internal, Z80 and 80186
- Disc Filing Systems
- ANFS
- Terminal Emulator & Editor
- View internal format
- Detailed differences between Model B, B+, Master 128K and Compact
- Comprehensive appendix on 65C12 instruction set

At the rear of the manual there are pull out circuit diagrams for the Master 128K.
A worth-while addition to any Master owner's library.

All this for just £17 (NO VAT)

NEW

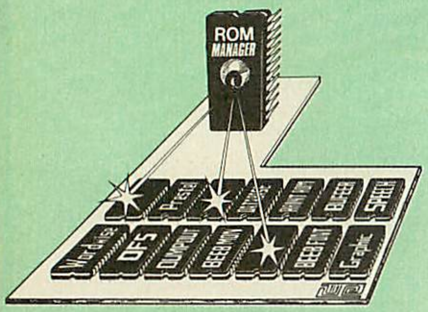
The Complete Mouse User Guide to BBC Micro

This manual has been written to reveal the secrets of the mouse. It explains all the principles required by the hardware and associated software, and also example listings for inclusion into custom programs. The manual first details the basic principles of the mouse and a simple program which uses these principles. This information should be adequate for most applications. However, it is possible to improve the performance of the mouse by expanding on the principles already used in the software. This is again fully explained and an example program given.
It is possible to gain a full understanding of the mouse from this manual. For those not interested in exactly how the mouse functions, complete example programs are also included. These may be typed directly into the micro, without the need for any understanding of the hardware or software involved, enabling the mouse to be used for custom applications.

Price £5.95 (No VAT)
Example programs on Disc £4.95

Continued →

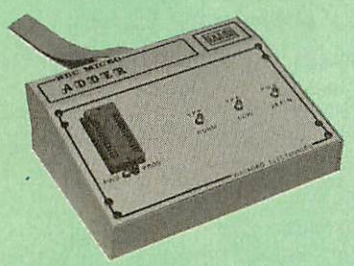
ROM MANAGER



Take control of your Sideways ROMs with ROM Manager. This powerful utility ROM gives you power over your sideways ROMs. Disable whole ROMs, send commands directly to named ROMs and many other powerful facilities.
"Provides comprehensive management of all your installed ROMs". (BEEBUG November '84.)

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The only low cost EPROM Programmer for the BBC Micro that will program both the standard 21V and the new 12V5, 27128 EPROMS.
Adder is the ultimate EPROM programmer for the BBC Micro. It will program many different EPROMs up to the very latest 27256 32K devices.
The Adder unit connects to the User Port and draws its power from there too. The EPROM is mounted in a top quality ZIF socket. There are no switches or controls as Adder is entirely software controlled.
The Adder software provides sophisticated facilities for programming EPROMs from a RAM image produced by loading disc files. The software is menu driven and designed for ease of use.
Features:
- Two ultra fast programming algorithms or standard slow algorithm.
- Supports standard 21V programming and newer 12.5 volt EPROMs. (Software switched).
- The RAM image to be programmed can be built up in many ways. Sections of image can be loaded separately. Part programming. Read EPROM. Edit data in memory.
- Automatic processing to handle a list of files to program into the EPROM.
- Automatic disc buffering to allow programming of 32K 27256 devices from a 32K file without extra effort.
- Verification gives detailed error list and checksums are maintained. There is also a blank check facility.
- Works with all standard filing systems. Generates header code for RFS ROMs to allow Basic programs etc. to be stored in EPROM. More than one file per ROM permitted.
- Programs the following EPROMs: From 2K to 32K: 2516, 2716, 2532, 2732, 2764, 2764A, 27128, 27128A, 27256 (Both 12.5V and 21V).

£65 (£5 Carr)

TEX EPROM ERASERS

EPROMs need careful treatment if they are to survive their expected lifetime. Over erasure of EPROMs very rapidly turns them into ROMs! The TEX erasers operate following the manufacturers specifications to give the maximum possible working life by not erasing too fast. We use these erasers for all our own erasing work.
- **ERASER EB** – Standard version erases up to 16 chips. **£28** (carr £2)
- **ERASER GT** – Deluxe version erases up to 18 chips. Has automatic safety cut-off to switch off the UV lamp when opened. **£30** (carr £2)
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This 415MI, king size multi-purpose foam cleaner spray is ideal for cleaning the Keyboard, Monitor, Disc Drive and your computer furniture surfaces. Simply spray on the surface to clean and wipe off with a clean cloth.

£2.50

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Ideal for cleaning and preventing static build-up on TV/Monitor Screens.

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Aerosol Dust Spray

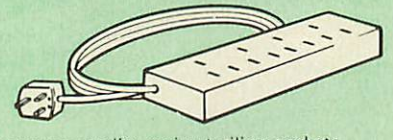
Aerosol Dust Spray
This simple to use aerosol spray is ideal for removing Dust and Dirt deposits from the Keyboards and similar inaccessible places. £3

SURGE PROTECTOR Plug

Fitted in place of your normal mains plug, this device protects your equipment against mains surges. Nearby lightning strikes, thermostats switching and many other sources which put high voltage transient spikes on to the mains. This can lead to data corruption in memory and on disc and can result in spuriously crashing machines. A must for every computer user.

Protection for only **£8.50**

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4 way top quality mains trailing sockets. Supplied wired up with mains plug ready for use. Can be screwed to floor or wall if required. Very useful for tidying up all the mains leads from your peripherals.

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This extremely useful tool allows you trouble free chip insertion and removal from your computer by distributing the removal force over the whole body of any 24 or 28 pin chip. **£2**

28pin DIL HEADER PLUG

SOLDER type **£1.50**; IDC CRIMP type **£1.95**

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Increase the speed of your Disc Drives by soldering this switch to your BBC B or B+ Keyboard.

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Supply from BBC power supply to standard Disc Drive connector.
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Paddles (15 pin 'D')	150p	250p
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This month's reader offer is far from trivial. From as little as £14.95 you can have the following Trivial Pursuit games, *Genius*, *Baby Boomer* and *Young Persons*. All three for the price of one.

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The screen layout is very similar to the board game with a chart showing the wedges of each player. Don't worry about running out of questions – there are spare blocks on a second cassette or disc. One feature of this marvellous family game is that there is a score board which keeps track of each player's performance and it can be consulted throughout the game. Send off today and you will receive bags of fun for all the family with this most popular game.

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DESIGNER DRUIDS

Remember the best type-in game ever? Well now you can make it even better

Chris Ruseman

Many moons ago (four, at least) an awesome type-in game was created, the like of which had not been previously encountered. It depicted the fabled journey of the Runemaker (Codename 'Druid') whose job it was to assemble The Cumentexis of Fire – a mystical charm fashioned from the seven Runes of Brationst.

The legendary listing appeared in the magazine we know today as *BBC Acorn User*, although scientists believe it was known then as '101 ways of using your Acorn Atom as a doorstop'

Using the latest technology and working with a team of top archaeologists we have finally created an authentic *Runemaker Game Editor* so that you may design your own fabulous *Runemaker* screens and scenery.

Using the editor

You will find the source programs for the *Runemaker Editor* on this month's yellow pages and instructions on how to enter the listings are given below. You will end up with a single machine-code program called 'Dredit' which can be run by typing *DREDIT or *RUN DREDIT if you are using a tape system.

Incidentally, a new set of *Runemaker* screens is included on the monthly disc by way of an example.

On running the editor, you'll be prompted for filenames to load. Three files can be edited: 'Scenery' which contains the 30 background sprites used in Runemaker, 'ScrDat' which contains the 16 screens and 'Runepos' which contains 64 potential positions at which the runes may be placed.

These three files are saved and loaded in that order and, when ready, can be included in the main game by re-running the listings from April's issue.

ILLUSTRATION BY GEOFFREY APPLETON



Take the old and create the new

The 'proper' names for the three files are provided by default and must be used when saving the final versions. However, you are free to use your own names for intermediate attempts. Simply type in the names you require, using DELETE as necessary, and use the up and down arrow keys to move between the three names. When you are ready to load them press TAB. To use the editor without loading any files just press ESCAPE.

The editor screen consists of five main areas. At the top is shown the current screen being edited. In the bottom left and right hand corners are displayed the 30 background sprites that you may place on each screen. In the centre is a 'blown-up' version of the currently selected background sprite and beneath this is a bar showing the colours available and the one currently being used. Under the colour bar are shown the current screen (A-P) and the number of rune positions left undefined (0-64). Because three files may be edited, there are three 'models' available and these are selected by pressing f0, f1 or f2.

f0 – The screen editor

The screen cursor is a flashing white rectangle which can be moved vertically using : and / and horizontally with Z and X. Moving off the left or right of the current screen will take you to an adjacent screen. Alternatively use SHIFT with < or > to select a screen.

Press RETURN to place on the screen the currently selected background sprite (shown by the steady white rectangle). Pressing DELETE will place sprite 0 there which should normally be defined as 'blank'. If you make a catastrophic mistake, you can 'undo' your most recent changes to the current screen by pressing U. To clear the screen using the current sprite press CTRL-C. Another useful

feature is 'trailing'. You can hold either RETURN or DELETE down and press the movement keys at the same time. This will produce a trail of characters which may save some designing time.

An important point to note is that surfaces upon which the Druid may jump should not be too high. This is a matter of trial and error as it is perfectly okay to include a lofty platform if the Druid cannot reach it. If however, the Druid's hat leaves a trail in the main game you'll know that a surface is too high up!

Another consideration is that the altar (to which The Cumentexis of Fire is taken) should be in the centre of screen D and must be two whole sprites high. Again, trial and error will help here. You will also need to consider the 'depths' of the sprites used for the altar (see below).

f1 – The sprite editor

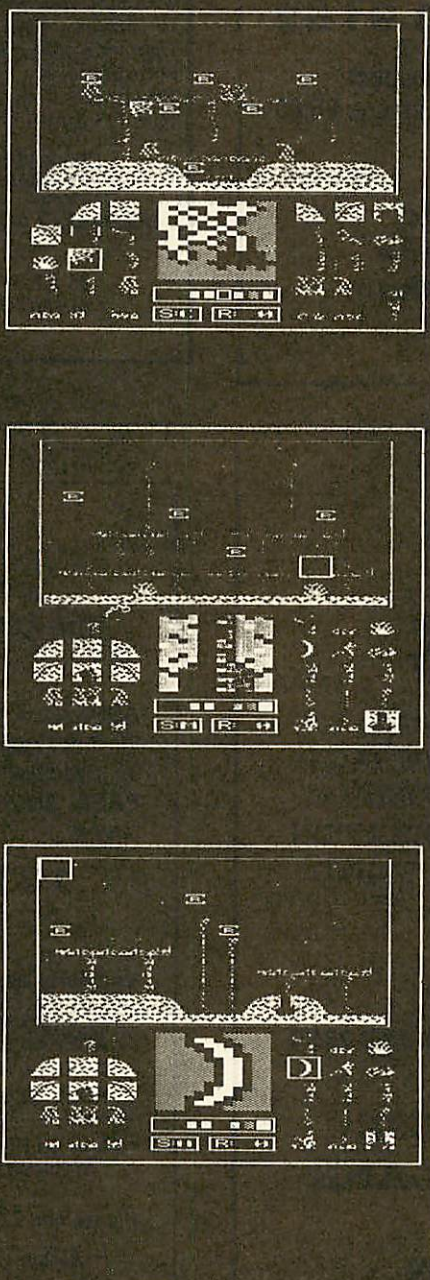
Pressing f1 will make the sprite cursor appear. Move this around using Z, X, : and /. The currently selected colour is shown beneath the sprite editor window and to plot a dot of this colour press RETURN. DELETE sets the current pixel to black. Colours are selected either by pressing 0-7 or by using the , and . keys to move left and right along the colour bar. Also, the sixth colour – the special 'transparent colour' – may be selected by pressing T. Selection of sprites is again performed using the arrow keys. Like the screen editor you can press U to undo recent changes and you may also 'trail' by holding down RETURN or DELETE while pressing the movement keys.

Note that colour six, normally cyan, is a special one. It is represented by a chequered pattern in the editor but is normally shown as black in the game. This is the 'transparent' colour and should be used instead of black for areas of sky and other parts of objects which flash during lightning bursts. So, character 0 is made up entirely of the transparent colour and many of the others will have a border in this colour.

Note also that the graphic effect of the lightning is greatly enhanced if you leave a black (colour 0) border around objects. This technique was used in the original set of screens and the new set on the August monthly disc. To try out your lightning effects press CTRL-F which will flash the sky as it is flashed in the game.

On doing this you will notice that red (colour 1) also changes to white. This is to enhance the effect of the lightning on monolith components which have 'historically' been fashioned in red and magenta, although you might like to try some other combinations.

You can copy one sprite to another by the following method. Move to the sprite to be copied using the arrow keys and press COPY. Then move to the destination and press R. Two other keys are provided for easy sprite design – H and V. These simply reflect the sprite in the two possible directions. The remaining feature of background sprites is depth. The game needs to know what the Druid can stand on and what he cannot. Each background sprite is 12 pixels across and these are divided into six pairs of pixel columns.



Design your own screens and scenery in the comfort of your own living space. Hide the runes from your friends and make the druid's task even more difficult – but remember, he can't jump too high

Each pair has a depth associated with it which is the vertical position at which the Druid will come to rest should he step on the sprite. Alternatively, there may be no depth set for a pair, in which case the Druid will fall straight through! To set a depth, move to the desired position and press the - key. To specify no depth press ^ instead. The depths are indicated by blue and green bands.

f2 – The rune editor

The final editor is used to specify potential positions of runes. At the start of each round, and when either a rune or 'burger' has been collected, a new position is sought for a new rune or burger. In all, 64 of these must be given and the number not yet specified is shown in a box at the foot of the screen.

The rune cursor is a flashing 'R' and is moved using Z, X, : and /. To select another screen use SHIFT with < or >. Pressing RETURN will set a rune position, unless all 64 have been set in which case you will hear a short beep. Pressing DELETE will remove any rune positions under the cursor.

Although you may save your work without specifying all 64 rune positions, you must ensure 64 are provided before including your new designs in the main game. A warning message is displayed prior to saving if less than 64 positions have been defined. There should also be a rune position on nearly all of the screens. As a rule, I've included at least one position on every screen except screen D – the altar screen.

This is vital because only one rune may appear per screen and anything up to seven runes plus a few burgers may appear at the start of a round. If there are not enough screens with potential rune/burger positions, the game will stop. You have been warned!

To load a set of files press CTRL-L. To save them press CTRL-S. In each case you'll be provided with default filenames that may be edited using the up and down arrow keys and DELETE as necessary. Use these default filenames when you are ready to include your screens in the main game.

Playing your own screens

To include your own screens and sprites in Runemaker, save the three files using the default names Scenery, ScrDat and RunePos on your disc or tape. Then assemble the main game code following the instructions in the April issue. If you are using tape, make sure the three files are saved in the appropriate place. See the April issue for details.

If you have included your designs in the main game and it does not work properly (or indeed, at all) check the following:

- Have you defined all 64 rune positions?
- Have you spread the rune positions over enough different screens?
- Have you set the 'depths' correctly for all of the sprites?
- Have you included surfaces that are too high?

The listings

The Runemaker editor is a machine-code program that is assembled by a series of Basic programs – five in all, plus another to create some useful data. All can be found on the yellow pages.

Type in listings 1-5 and save as Ed1 to Ed5 on your tape or disc. If you are using tape you must ensure they are saved in order. Do not attempt to run any program individually. Always re-save a listing that you have corrected.

Ed1 sets up important variables, Ed2 and Ed4 assemble the code and Ed5 incorporates two data files (created by listing 6 – see below), checks the program and, all being well, saves the editor as Dredit.

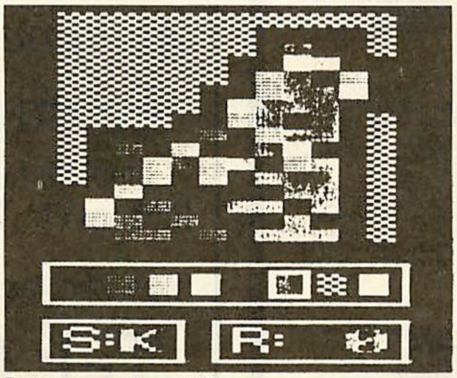
Before assembling the code, enter listing 6 and save as EdDat. When run, this creates two data files (EdVdus and Grass) which must be saved on your disc (or on your tape after Ed5). EdData needs to load a file from the original game in the April issue (Scrn2) which should be compiled onto your disc.

So, you are ready to assemble the editor when you have the following files on your disc or tape: Ed1-Ed5, EdVdus and Grass. Enter PAGE=&2700 and CHAIN "Ed1". Each program will chain the next (tape users will need to rewind the tape after Ed4 has been run the first time to the start of Ed2).

Once the code has been assembled the data files EdVdus and Grass will be loaded and the code will be checked. This is done in sections. Any errors will be reported, giving the listing number and section where the problem occurred. When all is well, the editor will be saved as Dredit and is ready to use.

How the editor works

Here's a brief summary of how Dredit works for technical Druid-following types. The main code starts at .dredt. The error vector is intercepted and the screen is set up. Osbyte calls are used to disable ESCAPE and set up the cursor keys. The main loop is imaginatively entitled .mainloop. This simply plots the cursor by calling .cursor and checks for keypresses. Any key pressed is checked against the table .keys. If identified as a valid key, the appropriate subroutine (also stored in the .keys table) is called.



Design your own sprites

The current screen is displayed by .drawmap which calls .zapone for each of the 96 background sprites. The .zapone routine uses 'linear' code for speed. Remember that screens are 'compacted' so they only use five bits per background sprite instead of the full eight. The .getmap routine expands the currently selected screen (stored in compacted form with the others at compacted%) and puts it at .screen%. The routine .putmap performs the reverse operation.

The 'zoomed' version of the current sprite is plotted by .zoom. This routine takes a background sprite and displays it at four times normal size, making use of .jsrd04. It is this subroutine that converts cyan into the chequered pattern, and also inserts the blue and green band indicating the 'depths' of a sprite.

Rune positions are plotted onto the screen using .show, a similar routine to those used in the main game. The R symbol is defined using colours 8-15 only. It is then EORed onto the screen. By setting colours 8 to 15 to white, the R appears white and is deleted by EORing again. For simplicity of code, the screen cursor and sprite indicator are drawn using standard PLOT codes (by .drawbox). Again, the EORing technique is employed to allow easy deletion of the box.

The purpose of other routines should be fairly clear from their names. Loading and saving of files is performed by .load and .save which, in turn, use .getnames which provides default filenames and permits the editing of them. The editor's own error handler is at .error.

A variety of data used by the editor is stored at the end of Ed4. An important part of this is .fmess – the loading/saving message. So that several separate messages are not needed, VDU 'on' and 'off' codes (Ascii 6 and 21) are inserted into this string where appropriate so only the desired parts of the message are displayed. After the data, space is set aside for various tables (using FNdef) and these are then filled by Ed5.

Finally many *BAU* readers have asked what memory is safe to use in a machine-code game such as *Runemaker*. A summary is given in table 1.

&00-&8F	Yes
&A0-&A7	No
&A8-&AF	Yes – but only for temporary use as this is corrupted by MOS calls
&B0-&CF	Yes – providing your game doesn't need to perform filing system operations
&D0-&FF	No
100-&1FF	No – this is the stack but bottom may be used with care if the stack is never filled up
&200-&3FF	No
&400-&7FF	Yes
&800-&87F	No
&800-&8BF	Yes – if not using printer
&8CD-&8FF	No – unless you aren't using sound envelopes
&900-&AFF	Yes – providing you aren't using tape or RS423 or more than 4 sound envenopes
&B00-&CFF	Yes – fine on Beeb, okay on Masters if you disable Econet with *FX 143,12,255
&D00-&DFF	No – this is the NMI work-space. You can normally use it if you disable NMIs with *FX 143,12,255 and put an TRI (64) at &D00 to be on the safe side.
&E00+	Yes – if your game doesn't need to load or save anything after being run, this whole area is fine. You will probably need to load the program higher up and copy it down though.

Table 1 – memory which is available to all machine-code games

SPYCATCHER

If you hold programs that are personal or just plain top secret, then here's what you need to keep them for your eyes only

Zak Kipling



When prying eyes are lusting after the program you've just spent the entire Summer holiday working on, there's actually very little you can do to stop the determined intruder. However, there are some quite simple methods of stopping the more casual hacker.

Programs can either be encrypted or, in the case of Master systems, altered to be *RUN only.

Listing 1 on the yellow pages will assemble and save a piece of machine code just under a page (256 bytes) long called ENCODE. This will work with any disc interface (including Acorn ADFS) but will not work on a tape system. Note that line 20 should be altered as indicated in the listing if you have Econet fitted. To protect a file, type *ENCODE followed by the filename of the file to protect and the password required.

This will render the file completely unreadable. To unprotect a file, follow exactly the same procedure as to protect it. You must use the same codeword and the ENCODE file must be in the current directory or library.

You can use two or more codewords. To do this simply use the same number of *ENCODE commands, for example:

```
*ENCODE PLANS MUSIC
*ENCODE PLANS ART
```

To unprotect, follow exactly the same procedure. The order is not important.

The codeword(s) can be up to 64 characters long (48 if Econet is fitted, because part of the memory normally used is reserved for Econet) and uses the *GSREAD format so it can include spaces – you can use |HBBC B|I or ||BArc||G Note that the program is case sensitive.

The machine code loads at &900 and uses &A00-&AFF as a buffer, so &900-&AFF will be corrupted when *ENCODE is used.

The program works by *EORing each byte in the file by the corresponding byte in the codeword.

Another useful method of protection (only available on the Acorn ADFS) is the E (execute only) attribute. To set this type: *ACCESS <filename> E.

This will inhibit the address information from a *INFO command and prohibit any attempt to load or list the file. It can only be *RUN. Of course, this should only be done on a file intended to be *RUN, allowing the use of the E attribute. When you have typed it in and saved it (as BASRUN), type:

```
SAVE "BASRUN"
PAGE=&900
LOAD "BASRUN"
?&70=9
RUN
```

When the computer prints Filename? type BASRUN.

The first line of the program to be converted must contain a special REM statement followed by whatever information you want to appear in the REM statement of the converted program. For example:

```
10REM1234567890123456
7890123456789012345678901234567890
123 TOP SECRET!
```

To use listing 2, type *BASRUN (BASRUN must be in the current directory or library) and type the filename you want for your program when prompted:

```
10REM TOP SECRET!
```

The rest of the REM statement has been replaced by 43 bytes of machine code. If you SAVE the program then it will not *RUN. You must save it with:

```
OSCLI"SAVE  <fsp> "+S
TR$~PAGE+" "+STR$~TOP+"
"+STR$~(PAGE+6)
```

<table>
<tr><td rowspan="2">File</td><td>ASCII</td><td>T</td><td>O</td><td>P</td><td></td><td>S</td><td>E</td><td>C</td><td>R</td><td>E</td><td>T</td></tr>
<tr><td>HEX</td><td>54</td><td>4F</td><td>50</td><td>20</td><td>53</td><td>45</td><td>43</td><td>52</td><td>45</td><td>54</td></tr>
<tr><td rowspan="2">Code</td><td>ASCII</td><td>S</td><td>E</td><td>C</td><td>R</td><td>E</td><td>T</td><td>S</td><td>E</td><td>C</td><td>R</td></tr>
<tr><td>HEX</td><td>53</td><td>45</td><td>43</td><td>52</td><td>45</td><td>54</td><td>53</td><td>45</td><td>43</td><td>52</td></tr>
<tr><td rowspan="2">Result</td><td>ASCII</td><td>|G</td><td>|J</td><td>|S</td><td>r</td><td>|V</td><td>|Q</td><td>|P</td><td>|W</td><td>|F</td><td>|F</td></tr>
<tr><td>HEX</td><td>07</td><td>0A</td><td>13</td><td>72</td><td>16</td><td>11</td><td>10</td><td>17</td><td>06</td><td>06</td></tr>
</table>

A Basic program converted in this way can be *RUN and so may be used with the E attribute to protect it. The code will convert it to a Basic program and RUN it. ESCAPE should be disabled to prevent it being listed after loading inside the Basic program. Happy Scrambling!

ILLUSTRATION BY SPIKE GERRELL

FAMILY TREE

Acorn was born in March 1979 out of Cambridge University and Sinclair Research. Sinclair's marketing man, Chris Curry and physics researcher Herman Hauser formed Acorn Computers to produce the System One.



This was one of the first home or hobby computers available in the UK and was sold in kit form, as well as ready built, and was soon followed by the larger System Two to Five.

The fledgling company borrowed heavily from the brains of Cambridge undergraduates, particularly Steve Furber and Roger Wilson, who went on to work for the company after graduation and still lead the forefront of Acorn technology today.

Already the start of the computer revolution was stirring and Acorn soon followed the System One with the Atom.

With expansions for disc drives, high resolution graphics, plug-in Rom software and an operating system which would 'never be bettered', the Atom clearly showed the direction Acorn was headed.

As new processors became more readily available Acorn faced the dilemma of which one to choose for the next machine. Rather than opt for just one which may have later proved to be a poor choice, the idea of an improved 6502 based micro with a range of 'second' processors connected by the Tube was conceived.



As the specification of the new micro, the Proton, was drawn up in 1980 the BBC was looking for a micro to adopt to feature in the forthcoming computer literacy project programs. Acorn successfully wooed the BBC away from rival machines with the promise of the Proton, and so it was that the BBC micro was born.

Nobody expected the BBC micro to succeed in quite the way it did. Only 12,000 machine were originally ordered by the BBC in 1981. By the time production of the model B stopped in 1986 over a million had been sold worldwide.

The success of the BBC micro lead Acorn to release a cheaper, cut-down version of the micro, free from the BBC's hold. The Electron came in at the end of the home micro 'boom' and never got the attention or sales it deserved.

However, in the meantime Acorn was investigating new areas. The Acorn Busi-



System Range Acorn's first computer, the System One was available in March 1979 as a £69 kit with just a 6502, 512 bytes Ram, keypad and machine code monitor software. The System Range developed all the way up to the rack-based modular System Five in 1980, more recognisable today as a proper computer.



Atom Acorn's first 'real' micro, the Atom was first sold in 1979 for £149. It also used the 6502, had 8K Ram and Acorn's first Basic. Some 30,000 were sold. The Atom was very much the forerunner of the BBC micro.



BBC micro The BBC micro was the turning point for Acorn. It was originally launched in September 1981 as two models, A and B with 16K Ram for £235 and £335 respectively.



BBC model B+ The stop-gap B+ was Acorn's answer to the large memory micros competing with the BBC micro in 1985. The B+ had the then standard 64K Ram and came with a disc interface built-in. Soon a 128K version was launched. Although the £499 B+ was little improvement over a model B, more than 28,000 were bought.



Master 128 The Master 128 consolidated all the extras which Acorn and others had been adding to the BBC micro range over the years. With 128K Ram, disc interface, numeric keypad and *View* and *Viewsheet* built-in in a redesigned (but still essentially BBC micro) case, the £499 Master became (and remains) the backbone of educational computing, selling over 200,000 so far.



Master Compact In the same vein as the Electron, the Master Compact was a cut down Master 128 sold as a complete system with disc drive and monitor. Inwardly identical to the Master (but without the interfaces), the Compact was redesigned into the popular '3-box' format and cost £599. Over 70,000 have been sold.



A3000 The latest in a line of pioneering micros, this offers all the power of the Archimedes in a package recognisable to the first buyers of the BBC micro. At £649 the A3000 offers 1Mb Ram, built-in disc drive, professional quality graphics and the most powerful home computer in the world.

THE ACORN LINE

Our family tree reveals all about Acorn and its offspring



Electron Acorn's attempt in 1983 to crack the mass home market, the Electron was essentially a cut down BBC model B. It lacked the teletext display and several of the interfaces but these were added later.



Communicator Another BBC micro-derived machine (1985) which never made it to the big time. It has a telephone and modem. With 128K and the 65SC816 chip it offered Beeb compatibility and a 16-bit mode. Only a few were sold to OEMs as rebadged products.



Acorn Business Machine The Acorn Business Machine was Acorn's attempt to break into the business market. Launched in 1984, the ABC range had four models in a '3-box' design. These repackaged BBC micros had Z80, 80286 and 32016 second processors.



Cambridge Workstation Acorn Cambridge Workstation was the only member of the ABC range which ever really made it. Based on a BBC micro with a 32016 second processor offered 32-bit computing for a reasonable price.



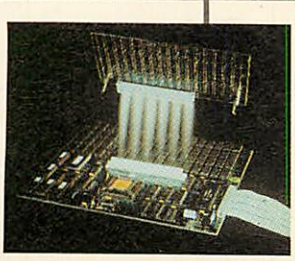
Arm Development System The Arm Development System (1986) was the first public product to use the Risc chip. Costing £4,000 it was essentially a second processor with the Arm chip set, 4Mb of Ram and bundled development tools and language. The development system was a powerful tool and paved the way for the Arc.



Prodest PC128S With an Olivetti badge the PC128C was really a recoloured Master Compact for the Italian market. A large number of UK software packages were translated to accompany the machine and Clares' *Fontwise* was bundled with it. There was even talk of an Olivetti Prodest User magazine.



Archimedes The Arc is the first micro to use Acorn's Risc Arm processor. Launched in June 1987 as three models (A305, A310 and A440) with 512K, 1Mb and 4Mb Ram for prices starting at £975, the Arc was the fastest personal computer around but still offered links with the past with a revamped BBC Basic and BBC micro emulator.



Springboard The Springboard is Acorn's one foray into the IBM PC world, but in a distinctly Acorn way. Springboard is an Arm development card to fit into IBM PCs. Launched in 1987 it costs £1,000 with 1Mb Ram and £2,000 with 4Mb.



R140 The R140 is Acorn's most up-market micro yet. Launched in January 1989 as a development of the Archimedes 440, it offers the power of a minicomputer, complete with a Unix-like operating system, on the desktop for £4,025.

ness Machine made use of the two processor architecture of the BBC micro to move the company into the lucrative business computing market.

Originally using a Z80 second processor and the CP/M operating system, the system was doomed from the start by the rise of the IBM PC in the business market. A version with the 80286 was planned but it was never launched.

Only the 32016 second processor version of the ABC ever made it, as the Acorn Cambridge Workstation. Although popular in some academic circles, even this super fast micro could not make this line of attack profitable for Acorn.

In the meantime, sales of the BBC micro were flagging and after the stop-gap measure of the B+, the true replacement, the Master was launched in 1986. Although not a major leap forward from the original BBC micro, the Master capitalised on all the best improvements to the BBC micro, the changing price of Ram and new production techniques.



The Master 128 and the later Master Compact became firm favourites of the education market and still sell well today, some 200,000 machines later.

Almost since the first BBC micro was packaged up and sold, the quest for a real technological replacement was on. Roger Wilson and Steve Furber in particular were searching for the chip for the next generation of micros.

16-bit chips such as those used in the IBM PC and later the ST, Amiga and Macintosh and even 32-bit processors such as the 32016 were found to be too slow and so the decision was made to produce Acorn's own processor – the now famous Arm Risc chip.

By 1985 the first Arm chips were made. In 1986 the remaining three chips in the set were operating and the Arm development system was released as a second processor. Much software development was done but this lagged behind the hardware. The first Archimedes was launched in 1986 with a stop-gap operating system, Arthur.



However, the software caught up and Risc OS was released this year closely followed by the latest world beater – the A3000.

S·C·A·N· LIGHT

The Hardware

Scan-Light consists of a half-width expansion board (that will fit into any Archimedes), with on board ROM software and a choice of scanners. The hand-held scanner is able to scan or digitise pictures, text, signatures, diagrams from loose pages and books at 200 dots per inch. The full width version can scan complete A4 pages of information while the half-width scanner is restricted to a scan width of 105mm (just over 4 inches).

Both scanners have a brightness control and two different scan modes—normal monochrome mode suitable for line graphics or text, and a dithered mode suitable for photographs or half tone pictures.

Scanning a document is simple, the scanner is placed at the top of the page, the scan button is held down and the scanner dragged down the page. As it moves over the document the scanned image is shown on screen and captured in the computer's memory.

The Software

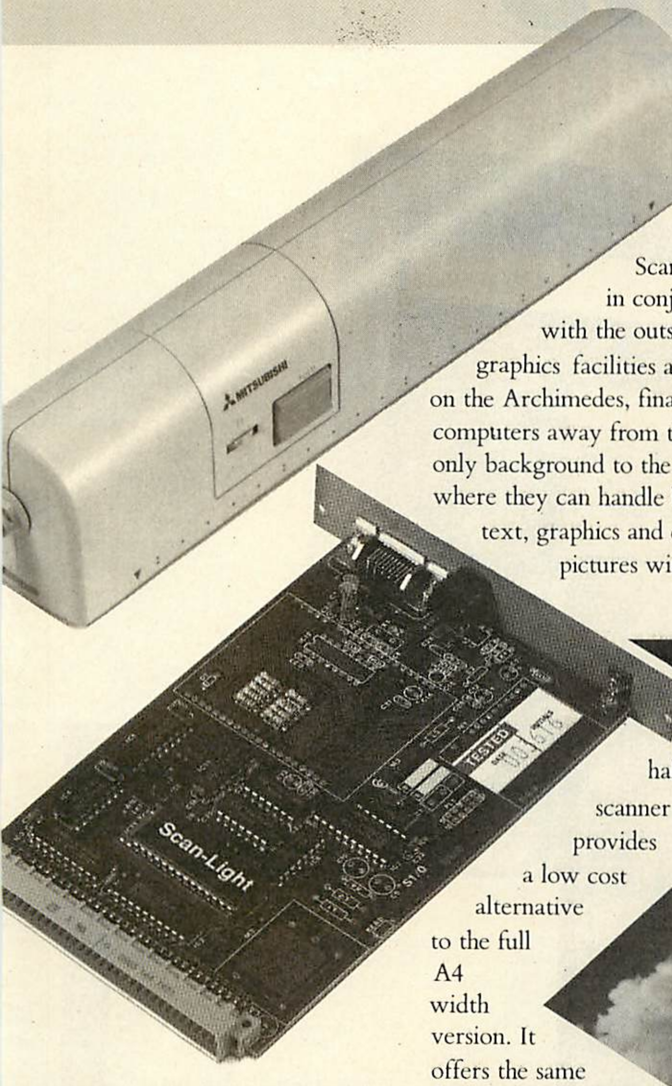
All the necessary scanner controlling software is included on a ROM as part of the interface board—it does not require programs to be loaded from disc.

The software is WIMP based and completely RISCOS compatible. This ensures it is both easy to use (all its features are controlled by menu options) and that it can multi-task with other RISCOS applications and run under the RISCOS desktop. (It is also completely compatible with the older Arthur operating system). Software features include:

- A full page preview is displayed, as the image is scanned, showing the digitised image as the scan progresses down the page.
- Once scanned the image is shown full size within a re-sizeable, scrollable window. The image may be magnified or reduced by any amount from 1% to 999% of original size.
- Pixel editing facilities allow individual pixels to be drawn or "undrawn".
- A variety of printer drivers is included to transfer the image to a range of dot matrix, inkjet and laser printers.
- A special grey-scale preview mode anti-aliases the scanned image to produce a true grey-level picture, allowing near photographic quality images to be obtained.
- Scanned images, or any selected part, may be saved in a variety of ways:
  (i) As a compressed data file (saves disc space).
  (ii) As a monochrome sprite.
  (iii) As a 16 grey-level anti-aliased sprite.

The latter option is ideal for incorporating pictures or photographs into other programs such as Paint and Draw or any DTP program such as the Acorn DTP or Impression programs.





Scan-Light

Now you have twice the choice!

Scan-Light, in conjunction with the outstanding graphics facilities available on the Archimedes, finally takes computers away from the text only background to the point where they can handle both text, graphics and digitised pictures with equal ease.

Scan-Light Junior



This half-width scanner provides a low cost alternative to the full A4 width version. It offers the same facilities and runs with exactly the same software but is limited to capturing 4 inch wide images. In addition, Scan-Light Junior offers a choice of scan resolutions from 100 dpi to ultra-high 400 dpi.

Prices

Scan-Light Junior £189.00 + VAT for half-width scanner, interface board and software.

Scan-Light £449.00 + VAT for A4 width scanner, software and interface board.

Access and Barclaycard welcome.

Scan-Light runs on both the Arthur and RISCOS operating systems, and requires a 1 MByte machine.

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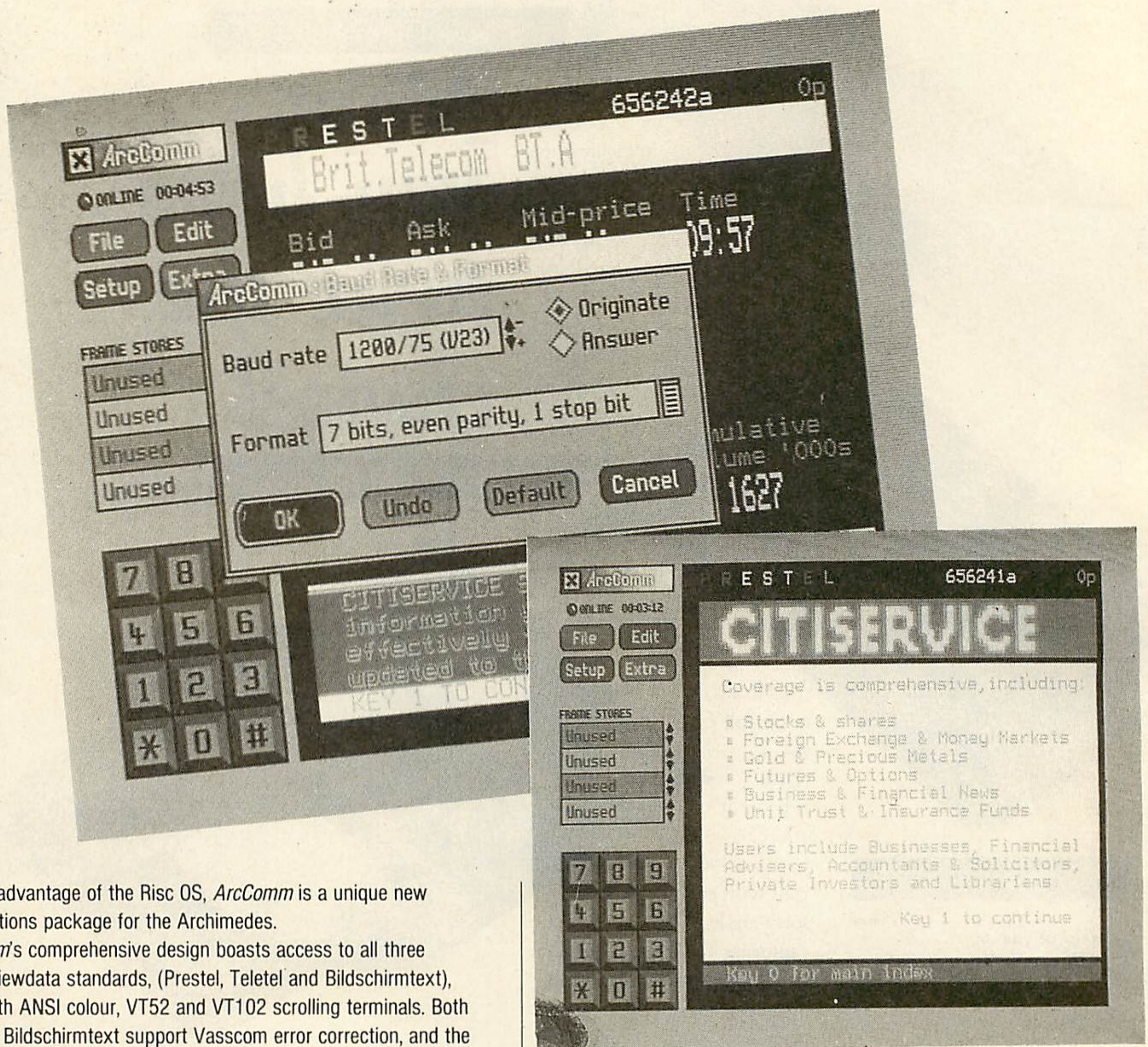
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OFFERS

ARCCOMM



Taking full advantage of the Risc OS, *ArcComm* is a unique new communications package for the Archimedes.

ArcComm's comprehensive design boasts access to all three European viewdata standards, (Prestel, Teletel and Bildschirmtext), together with ANSI colour, VT52 and VT102 scrolling terminals. Both Prestel and Bildschirmtext support Vasscom error correction, and the VT102 terminal offers 132 columns, and smooth scrolling. Full coverage of international character sets is included.

The package has been produced with ease of use as a priority. All screen displays are clear and uncluttered, with pop-up menus and dialogue boxes making control as simple as possible.

You won't have to remember strings of numbers! Its telephone number list allows you to dial and log-on automatically. You can store viewdata frames while on line, edit and upload mailboxes, and load/save frames or screens onto disc.

While communicating, it makes use of the full screen, rather than running in a desktop window. But you can return to the desktop at any time, and *ArcComm* remains running as an icon on the icon bar. You can use other desktop software while *ArcComm* stays on-line but inactive. And clicking on the icon brings back full-screen communication.

You can automate the log-on sequence for any comms service, by using *ArcComm*'s own procedure language. This allows you to log-on, set up the correct terminal emulation and all your preferences through a single menu selection.

ArcComm supports Hayes, DTI and manual modems, with details of how to write drivers for other modems in the User Guide provided. You will need Risc OS to use the package, and 1 Mbyte or more of memory. The package costs £29.95.

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OFF THE WALL

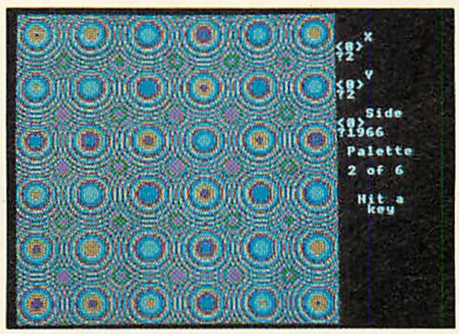
Want some great wallpaper ideas? Or just fancy knocking up some way-out patterns? Then enter your numbers, any numbers, and take your pick

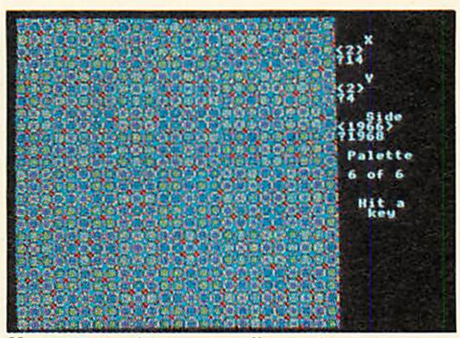
Colin Attenborough

Algorithms to produce pretty patterns on the screen of your micro may be nothing new but there is something fascinating about manipulating complex patterns with just a few deft strokes of the keyboard. The Archimedes is capable of some impressive displays and has the speed for manipulating the numbers quickly, and this program makes good use of both abilities.

The program uses Arm code for speed to produce varied and complex patterns with just a handful of parameters entered to completely alter the result.

The algorithm used was devised by John Connett of Minnesota University. Give Connett's algorithm three numbers, and it will draw a screenful of 'wallpaper'. As the numbers vary, the wallpaper changes from simple circles to very complex carpet-like patterns.





You can create some really wacky designs

Using the program

Type in and run the program from the yellow pages. Try any numbers – positive or negative, integers or reals (birthdays are good fun). If they're too big, you'll soon be told.

The most intricate patterns occur when the three entered numbers and 256 share no common factors. Try 41, 43 and 191 for example. When a pattern has been drawn, hit any key to see it again with a different allocation.

This is repeated for all six permutations of colour assignments to non-zero results of the MOD 4 process. You'll then be asked to enter new numbers and reminded of the ones you last used. If you simply press RETURN, the previous value will be used again.

John Connett's original algorithm for this program appeared in the Computer Recreations section, Scientific American, *September 1986.*

THE ALGORITHM

In terms of words, the algorithm goes something like this: enter X, Y and Side. To decide the colour of a point J% steps across and K% steps up from the bottom left hand corner, form squares of X+J% x Side/256 and Y+K% x Side/256.

Add the squares together, divide by 4, and keep the remainder. This gives a number from 0-3.

Now colour the point according to this number. Do this for all the points in a 256 x 256 square.

In Basic, it would look something like the following:

```
10 INPUT X
20 INPUT Y
30 INPUT side
40 S=side/256
50 MODE 1
60 FOR J%=0 TO 255
70 FOR K%=0 TO 255
80 XX=X+J%*S
90 YY=Y+K%*S
100 squaresum=XX*XX+YY
*YY
110 colour=squaresum M
OD 4
120 GCOL 0,colour
130 PLOT 69,4*J%,4*K%
140 NEXT K%
150 NEXT J%
```

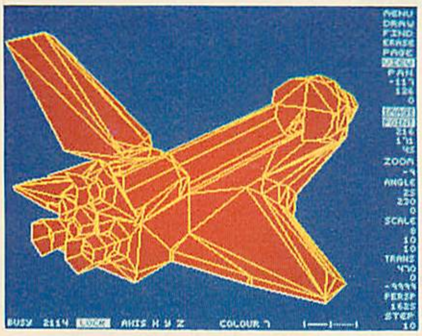
This is the simplest, but slowest, form. A faster way is to calculate the squares of X+J% x Side/256 and Y+J% x Side/256 for values of J% from zero to 255 and store them in arrays. They can be pulled out of the arrays as needed, summed, MODed, and drawn on the screen.

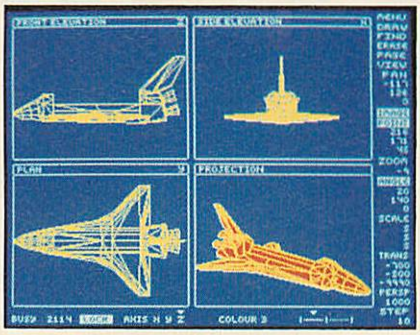
That's what this program does, and it also pokes values directly to the screen and is written in Arm code. This makes it fast enough to draw a pattern in less than a second and to allow the redrawing of the pattern in each of the six possible permutations.

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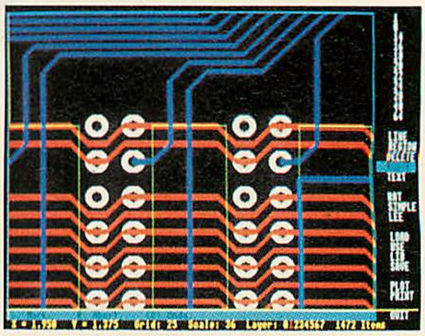
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£99.95 (ARC) New

GOOD WORDING

For Wordwise Plus users here's something to make scanning and loading your files a lot easier

Nick Munns

A short time ago a friend of mine, an ardent *Wordwise* user, complained that the only shortcoming of *Wordwise Plus* was the lack of a file loading program. To load a file one has to call up the disc catalogue with *. or *CAT, memorise the name of the file required, return to the *Wordwise Plus* menu, press 2, type in the memorised file name and hope for the best.

If the filename is simple and explicit then there should be no great problem but how many files are actually named like this? Look at the time-consuming nature of trying to scan through several files quickly.

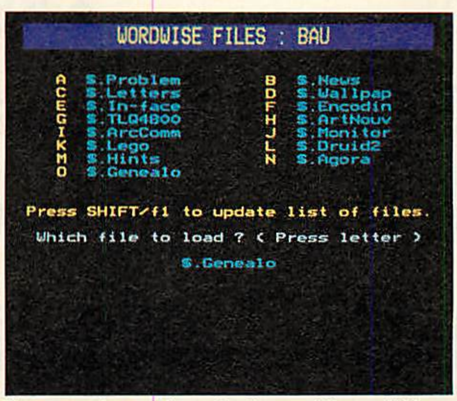
This program was developed to try to make these problems a thing of the past and it also serves as a useful introduction to programming with the segment programming language of *Wordwise Plus*.

Two programs are provided on the yellow pages and should be typed in, one as !BOOT file (created with *BUILD !BOOT) and the second program must be typed from within *Wordwise Plus* itself, and saved under the name of !MENU.

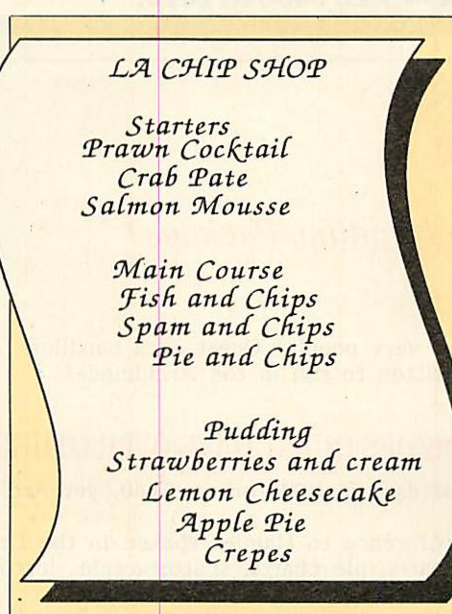
The !BOOT file sets the variable Z% for later use to indicate the position in memory where the disc catalogue resides in the BBC model B or the Master.

The model B places the catalogue at &0E00 while in the Master it is found at &C000. The !BOOT ends by calling the f0 key twice through inserting its code into the buffer, resulting in the !MENU file now resident in segment 0 being called into play.

The !MENU program resides in segment 0, and when executed for the first time, it writes a short routine in segment 1, and then produces a copy of the disc contents in segment 2 (without including either !BOOT or !MENU).



You can glance through all your files quickly



This takes between four and 12 seconds depending on the number of files present but the routine only has to be executed once per disc.

The file loading menu is then displayed, with each file listed alongside a letter. Simply pressing any letter will load the corresponding file and re-enter the main *Wordwise Plus* menu which is currently being entered.

At any time the file loading menu may be called up by pressing SHIFT-f0, so many different files can be quickly loaded and checked for content. Calling up this menu does not affect the file currently residing in the main text area.

To abort the file loading menu and return to your main text, simply press ESCAPE twice and then the figure 9.

If the file loading menu is called up while you are in editing mode – that is, while your text or a segment is on the screen – then choosing a file and loading it will not return you to the *Wordwise Plus* menu.

However, this is easily done by pressing ESCAPE. Pressing any other key would insert that character at the beginning of your newly loaded text, or sometimes even cause the computer to freeze up completely.

If, during a session at the computer, files happen to be deleted or, indeed, added to the disc then the list of files in the file loading menu will have to be updated. Pressing SHIFT-f1 does this. SHIFT-f1 is also used to produce an up-to-date menu, for any other drives simply type *DRIVE and then press SHIFT-f1.

Each additional disc surface must include a dummy file called !BOOT (just type SAVE "!BOOT") as the program calls *INFO !BOOT in order to update the disc catalogue residing in memory.

The original version of this program was much greater in length, with much of it concerned with aesthetically pleasing screen displays.

However, it was soon realised that such a program was eating up much needed wordprocessing memory, and that files that previewed, in the past, in mode 0 were now previewing in mode 7. This version has had many of the 'cosmetic' lines removed.

If you need it, further memory may be regained by removing the blank lines in the listing (which are only put there for the purpose of aiding readability), removing unnecessary spaces, and reducing *Wordwise Plus* commands to their minimum abbreviations such as P. instead of the complete PRINT command.

ROBOTECH

We take a look at the best control technology devices ready to play their part in the National Curriculum

Chris Drage and Nick Evans

The National Curriculum places special emphasis on design and technology and specifically states that 'technology must form a foundation subject for all pupils between the years of five and 16.' It also emphasises children as active participants as well as users and spectators.

Part of the natural development of design and technology in schools must extend into the realms of computer control where pupils will be involved in projects which make use of such control and will be expected to apply the knowledge they gain in science. Control presents an opportunity to unite and develop a wide range of skills and experiences acquired across the curriculum in a meaningful way.

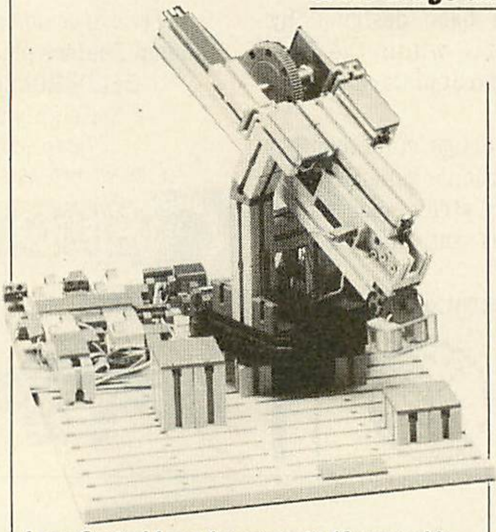
Buggies can provide fundamental concepts as a basis for utilising control technology. Suitable examples, including the Lego/Resource Buggy and the Trekker System (Clwyd Technics) can demonstrate the basics of computer control and the principles of robotics. The Trekker System is especially versatile for older children and can be recommended.

With the exception of the Trekker, buggies do not readily permit children to design, test and modify their own systems – key elements of technology in schools. A vital aspect is the teacher's attitude. If the teacher is to be wholehearted and confident in their approach to control it is important that the resources cater for the non-specialist teacher, especially at the primary level.

Similarly, there can be a problem finding material which reflects both good classroom practice and which compliments a wide range of curriculum themes and subject areas.

Two companies have responded to this need and have fortunately produced worthwhile resource packs: Lego Control Logo and Economatic's Computing Experimental Kit have both been designed to provide teacher support and to develop the learning experiences and important technological skills that are described in the National Curriculum.

Lego Control Logo brings together the use of the well established Lego constructional materials and the easily accessible Logo language with its control application. The package, aimed at the seven - 13 age range, consists of four elements: Lego Technic Control 'O' kit (478 pieces with eight booklets), a Lego Technic Interface with power supply unit, a resource pack and an optional Logotron Logo chip.



Lego Control Logo for seven to 13-year-olds

All the constructional elements are packaged in a convenient blue storage case which facilitates speedy location of the components.

Included with the Lego mechanisms are motors, switches, lights and sensors which allow the construction of a large variety of models. The resource pack is the core of Lego's package and this comprises six booklets, two manuals and a disc of software.

The booklets aim to guide the inexperienced teacher towards full integration of the materials with class teaching. They cover a wide range of topics including possible ways of integrating the materials in the classroom (including four case studies), a tutorial, reference guides and a variety of themes with examples of children's work. The kit successfully builds on the Lego Technic construction sets and can be further extended with the Lego Technic Control 1 and 2 sets for secondary pupils.

Introducing control technology to both inexperienced teachers and pupils poses rather a problem. Familiarisation should take place before such resources are presented to children. The traffic lights project is immediately familiar to all concerned and offers a means of introducing computer control using Lego Control Logo.

One class of eight-year olds who were involved in a project about wheels appreciated the control aspects of the dragster, stop/start, gates project in the kit. Having built various vehicles themselves and then tested them down a slope, the children then had to time their vehicles using the computer.

The start gate straddling the track is lifted by the 'start judge' pressing a switch. A yellow warning light is then switched, and this changes to green after a few seconds and the vehicle is released down the slope while the computer begins counting.

At the bottom of the slope the vehicle passes through a second gate containing an opto-sensor which triggers the end of the count and the computer then display the time taken.

The detailed Logo procedures involved are defined as simple 'words' by the teacher allowing the children to work only with procedures termed SWITCH, LIFT GATE, TIMER ON and so on. This helps them to break down the overall problem into simple, comprehensible components.

Lego has produced an excellent kit of components which builds successfully on construction materials familiar to children from their early years. These materials can be combined with both junk objects and other Lego Technic kits to produce an infinite number of control applications which can be integrated into familiar curricular themes.

The kits will seem relatively expensive to most underfunded school budgets. However, one Lego Control Logo kit can be used throughout the junior or

middle school as it is both cross-curricular and open-ended in design. Shared use by all classes will help off-set the high cost but at least one computer must be fitted with Logotron Logo.

The Science National Curriculum, (attainment target 12, levels 4-10) emphasises the importance of control technology for secondary pupils. Economatics (makers of the original *BBC Buggy*) has been quick to recognise this and is marketing a range of materials which will span the primary and secondary phases, extending to the upper secondary level.

The Computing Experimental Kit (nine-14 years) is based on Fischertechnik construction materials and is designed to complement GCSE and Standard Grade syllabuses in both CDT Technology and IT/Computer Studies.

The Kit forms a basis on which a comprehensive system can be built. It comprises a construction kit with motors, sensors and switches, substantial user and construction guides, an interface, power supply unit, control Rom and two discs of software.

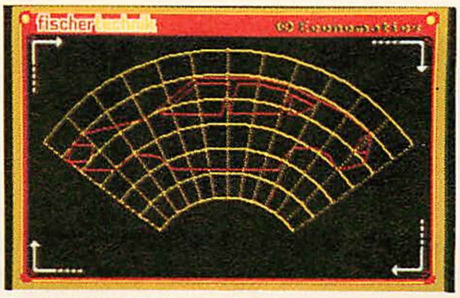
The kit contains all the Fischertechnik components needed to build a range of models which are intended to give pupils experience of real control applications. These start with a simple winch and culminate in a buggy which can perform a variety of tasks.

However, each model can be developed, extended and combined with further components or materials to produce more ambitious projects and by colour coding the connectors, wiring faults are simplified. All construction, programming and project developments are described in considerable and easy-to-read detail in the user guide.

In use, Fischer components prove very accurate, reliable and popular with pupils. However, they are a unique construction material so considerable familiarisation is required in order that children appreciate the subtle differences and relationships between the pieces.

There are few problems apart from the fiddly and time consuming task of having to attach the interface connector to the 20-way cable. Economatics says it will consider supplying the lead ready-made in future kits.

The menu-driven programs admirably demonstrate computer control with attractive graphics and colourful tables. The control Rom supplied contains high-level commands for use in Basic programs and the end result is a unique 'control-Basic'. Although the suitability of Basic as a programming language for the majority of children must be questioned, it does provide a means of creating more complicated control procedures.



Economatics' kit forms basis for projects



Gain experience of real computer control

A structured course in control Basic is included in the user guide for those who wish to continue their work to a higher level.

A notable feature of the Fischertechnik interface is its two analogue channels which extend sensing to include temperature and light levels. This allows scientific investigations to be followed – for example the heating and cooling of a model house – and extends the abilities of buggies to search for a light and move towards it.

The Computing Experimental Kit can be extended in a number of ways by using standard sets of Fischertechnik materials from Economatics.

The Project 2000 kit provides additional components for many more ambitious projects and also much needed storage boxes. One Project 2000 kit provides sufficient materials for a group of 10 pupils and even extends the use of the system into physics courses.

The Electromechanics Kit and its large range of switches and sensors build well on control concepts introduced with the Computing Experimental Kit. Connecting motors, sensors and switches to many buffer boxes can be a daunting task as a 'spaghetti-junction' of wires develops. The Fischertechnik ribbon cable connector allows all the connections to be made on a plug block which mounts directly onto the models. Only short connecting leads need to be used.

If the suggested colour coding is also used then connecting models to the block is a quick operation. The single ribbon cable to the interface unit is not only tidy but extremely useful for the buggy model.

In September, Economatics plans to release some control-design software which amounts to nothing short of a revolutionary approach to secondary control languages. It is ideally suited to controlling Fischertechnik models, and the pre-release version is indeed impressive. Watch these pages for further developments.

Both Lego and Economatics have provided valuable resources in the field of control technology. Both place a heavy emphasis on pupils designing, building, testing and refining – all of which are essential elements in the design process. Lego uses a construction system familiar to most children with a plethora of support materials to help non-specialist teachers get to grips with control in the classroom.

The Economatics's system, using the Fischertechnik Computing Experimental (and other) Kits, offers a comprehensible interface which is free of spaghetti-like leads making the process of swapping models simple. The system can even be taken to electromechanic and electro-pneumatic control.

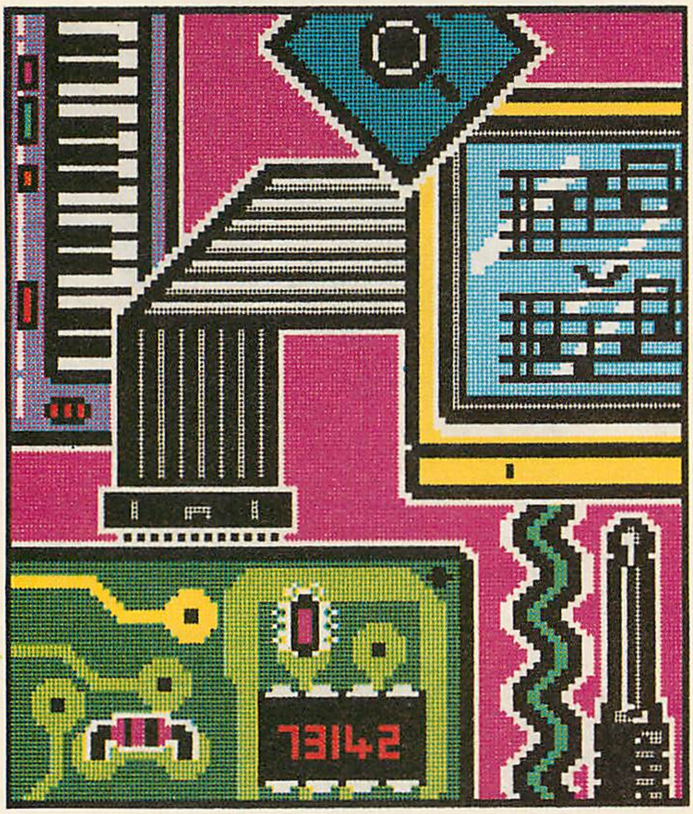
Each company's materials are flexible enough to span the primary and secondary phases and to be extended in a variety of directions.

Control Logo *costs £300 from Lego Dacta, Lego (UK) Ltd, Education Department, Ruthin Road, Wrexham, Clwyd LL13 7TQ.* The Computing Experimental Kit *costs £222 (there is an educational discount available) from Economatics (Education Limited), Epic House, Orgreave Road, Handsworth, Sheffield S13 9LQ.*

PORTS OF CALL

Build our general purpose expansion card and use it to add a BBC micro-type user port to your Arc

Alex van Someren



In last month's article we saw how the Arc has been designed to allow expansion cards to be fitted inside the computer's case. An expansion 'backplane' with either two or four slots allows interface cards to gain access to the data, address and control signals generated on the main circuit board. All expansion cards need to buffer (amplify) these signals and decode them in order to decide which interface card is being selected.

To make the creation of expansion interfaces simpler, Atomwide has produced a prototyping card called Apec which forms the basis of this series of articles. In this article we will examine the Apec card in more detail and the ways in which it can ease the process of creating new expansion interfaces.

Apec follows the Acorn expansion card guidelines very closely. It is a single-width 'Eurocard' (an international standard which defines the size of the circuit board) and has provision for a 64-way connector at one end ready to plug into the Archimedes. The circuit board is overprinted with copper tracks which interconnect integrated circuit sites so as to provide an interface of the kind shown in the block diagram last month. It only remains to solder the appropriate connector, discrete components and ICs (or sockets for them) into the board for it to be ready for use.

For maximum versatility, the Apec card can be constructed to a variety of degrees of completeness. The simplest possible expansion interface consists of just three signal buffering ICs, two 74HC541s and a 74HC245, and a sprinkling of decoupling capacitors.

To conform properly to the Acorn specification, a small permanent memory device such as an Eprom should be added, and pre-programmed with a short routine to allow the card to respond to interrogation by the operating system.

Most Apecs will require the standard address decoding circuitry provided by a 74HC04, a 74HC32 and a 74HC139. This divides the lower 2K of the expansion card memory space into four 512-byte blocks and produces eight active-low control signals which indicate a read or write to a particular block.

If an Eprom larger than 2K is to be fitted (to accommodate a lengthy piece of support software) then another IC, a 74HC273 octal latch, needs to be fitted to allow the Eprom to be 'paged'. A set of links on the Apec allows one of the block write lines to be used to address this latch.

The Apec is supplied with a pre-programmed Eprom containing the necessary operating system support software and a number of useful routines provided in the form of SWIs (SoftWare Interrupts). This Eprom requires the decoding circuitry and paging latch to operate.

If an Apec is fitted in the Archimedes it should announce itself when the command *PODULES is entered at the command line:

Podule 0: No installed podule
Podule 1: No installed podule
Podule 2: Atomwide Prototyping

1 off	APEC bare PCB
1 off	APEC pre-programmed EPROM
1 off	64-way a+c DIN 41612 right-angle male plug
1 off	28-pin IC socket
5 off	10 nF decoupling capacitor
1 off	10 uF Tantalum capacitor
2 off	74HC541 octal buffer
1 off	74HC245 octal bi-directional buffer
1 off	74HC273 octal latch
1 off	74HC04 hex inverter
1 off	74HC32 quad OR gate
1 off	74HC139 dual 2 to 4 line decoder
20 off	0.1in pitch strip pins
10 off	0.1in pitch pin jumpers
4 off	20-pin IC sockets
1 off	16-pin IC socket
2 off	14-pin IC sockets

Table 1: The components which are required to build the basic Apec

ILLUSTRATIONS BY JONATHAN INGLIS

```
        Expansion Card
  Podule 3: No installed podule
```

The Apec is available either as a bare board or fully constructed. If you intend to purchase a fully constructed Apec then you may wish to skip this section on the first reading.

Constructing the card is simply a question of acquiring the relevant components and soldering them into place. The components required to follow this series of articles are shown in table 1.

Fit the connectors first, then discrete components such as resistors and capacitors and finally the ICs. This order of construction reduces the chances of soldering errors damaging the ICs. Be particularly careful when dealing with the ICs. Don't remove them from their protective packaging until the last minute and then handle their legs as little as possible. Use sockets for all the ICs.

Using the Apec

Once you have an Apec which responds to the *PODULES command as described above you are ready to start using it in earnest. You can double-check that the Apec software has been downloaded into the Arc correctly by entering *MODULES at the command line and examining the end of the list displayed for the line:

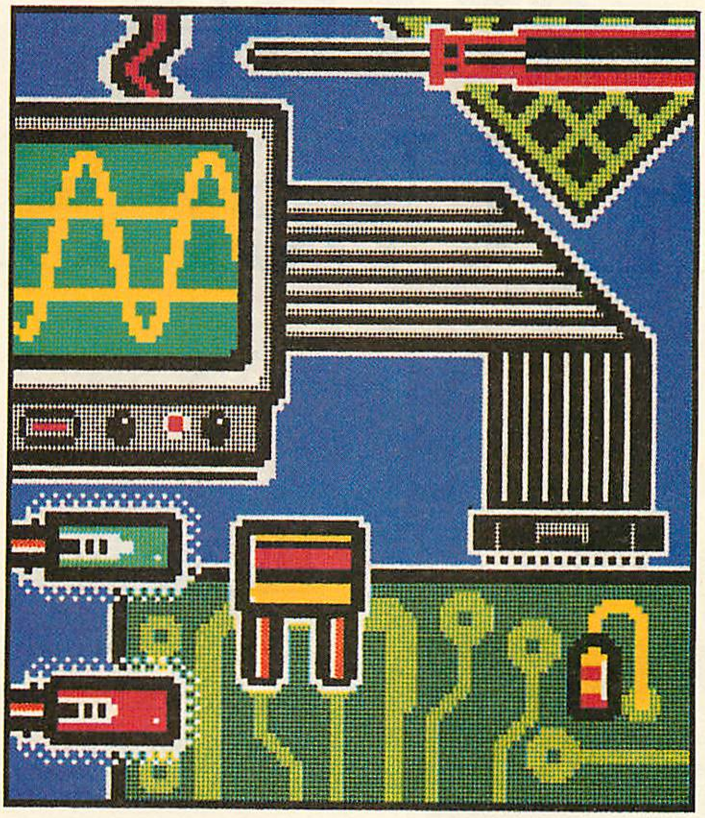
```
xx yyyyyyyy zzzzzzzz
APECutils
```

This indicates that all is well. The Apec is controlled using a set of SWIs. These may be executed either by using the SWI instruction in the machine code assembler or (more simply) by using the BBC Basic V statement SYS. Version 1.2 of the Apec Eprom responds to eight such SYS statements, as outlined below:

```
    SYS "APEC_Write",slot
%,block%,offset%,value%
    SYS "APEC_Read",slot%
,block%,offset% TO ,,,va
lue%
    SYS "APEC_BlockWrite"
,slot%,block%,offset%, s
ource%,length%
    SYS "APEC_BlockRead",
slot%,block%,offset%,des
t%, length%
    SYS "APEC_Slow",slot%
    SYS "APEC_Medium",slo
t%
    SYS "APEC_Fast",slot%
    SYS "APEC_Sync",slot%
```

The parameters to the SYS statements allow you to select which expansion slot is to be affected (slot%=0, 1, 2 or 3), the 512-byte block of expansion memory space to be accessed (block%=0, 1, 2 or 3), the byte within that block (offset%=0 to 511) and the value to be read or written (value%).

Sixteen bits of the value are passed to the expansion card but Apec only buffers eight of them on the basis that most simple peripheral expansions are based on low-cost 8-bit devices.



The block read/write SYS statements are used to transfer a block of length% bytes from main memory address source% to a fixed expansion card address or to main memory address dest% from a fixed expansion card address.

The last four SYS statements allow you to program the Apec software to drive slot% at the specified speed. The default setting is 'slow'.

The SYS statements make it easy to control Apec from Basic. Just determine which slot the Apec has been fitted in and decide which memory locations need to be accessed in order to transfer data. For example, if an Apec fitted in slot 2 had an 8-bit latch fitted at block 0, offset 16 then we could write a byte of data to it with:

```
    SYS "APEC_Write",2,0,
16,byte%
```

Similarly, we might read data from an 8-bit device on the same card at offset 32 with:

```
    SYS "APEC_Read",2,0,3
2 TO ,,,byte%
```

If any parameters are supplied with the SYS statement which are outside the addressable range of the Apec circuitry an error will be raised indicating which field of the statement is out of range.

Sample circuitry

About half of the Apec circuit board is taken up by a prototyping area of 0.1in pitch plated holes arranged as a rectangular grid. Along the edge this area has in common with the decoding circuitry is a row of holes which carry signals from the expansion interface.

To illustrate the use of Apec in real interfacing applications let's consider the design of a useful peripheral for the Archimedes – a BBC micro compatible user port.

The BBC micro's user port is provided by a general-purpose interface control IC known as a Versatile Interface Adaptor (VIA) with the part number 6522. This provides a number of on-chip timers, a shift register, interrupt generation and mask circuitry and a pair of 8-bit parallel ports each of which has two programmable control lines.

On the BBC micro the second of these parallel ports has all 10 lines (eight data lines and two control ones) wired to a 20-way IDC socket on the front underside of the computer.

To create the same kind of user port on an Archimedes you need to fit a 6522 onto an Apec and wire it so that each of the 16 on-chip registers may be addressed using SYS statements. The 6522 is a good choice since it requires just one extra gate to allow it to be used in this way.

The 6522 has two chip select lines, one of which must be driven low and the other of which must be driven high to activate the chip.

It also requires a signal to indicate the direction of data transfer (Read/not Write) and a feed of a regular 2MHz clock to drive internal timers and so on. The 6522 must of course be connected to the processor's buffered data lines and to

the bottom four address lines to allow access to its registers.

To access the 6522 you need to use the Archimedes' 2MHz Synchronous access mode. This involves altering the connections on the Apec PCB so that pin 1 of IC6 is connected to OV instead of to notPRE – simply cut the track connected to pin 1 and re-make pin 1 to 0V using a short length of insulated wire.

This process causes the outputs of one half of the address decoder to be driven whenever a synchronous access is made, regardless of whether it is a read or write access involved.

It simply remains to connect the 6522's active-low chip select (CS2) to the decoder output notRead 0 and its active-high chip select (CS1) to +5V.

The 2MHz clock is not available at the row of holes on the edge of the prototyping area but is in a suitable form on the backplane connector at pin 27c. It must therefore be wired across by hand to the appropriate pin of the 6522.

It just remains to wire the pins of the 6522 'B' port to a suitable 20-way IDC connector and your user port will be ready for programming. The complete circuit diagram of the user port is shown in figure 1.

Programming the Apec user port

Once the user port is constructed on the Apec card it just remains to gain access to it from software. On a BBC micro this is achieved by using a 'peek' command. To read from the 'B' port data register (the user port) you would write:

```
value%=?&FE60
```

reflecting the fact that the user port 6522 has its registers mapped into memory starting at &FE60 on the BBC micro.

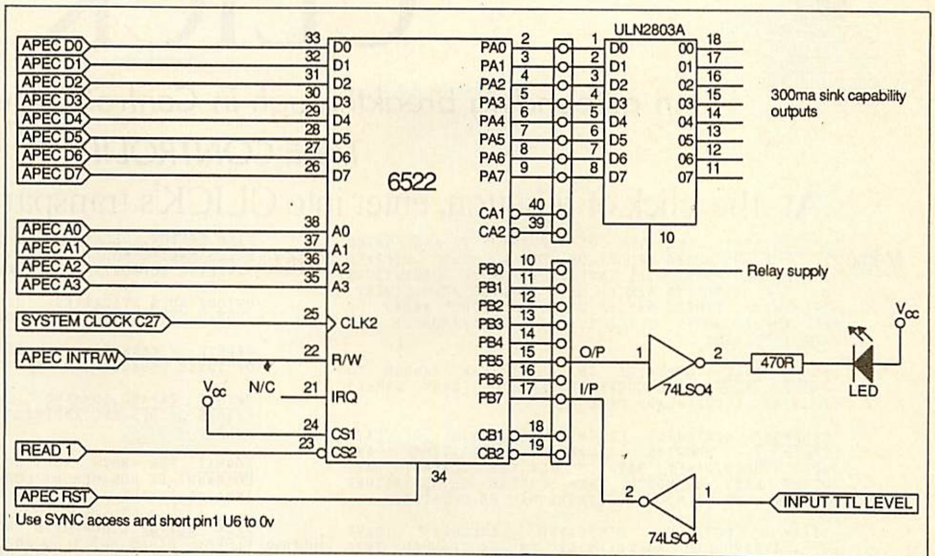
To achieve the same on an Archimedes you need to use a SYS statement. Furthermore, because the 6522 is tied to the system 2MHz clock it must be accessed in 'Synchronous' mode. This means you need to use the following two SYS statements, assuming the Apec is in slot 2 and the 6522 wired to the block 0 control lines:

```
SYS "APEC_Sync",2
SYS "APEC_Read",2,0,0
TO ,,,value%
```

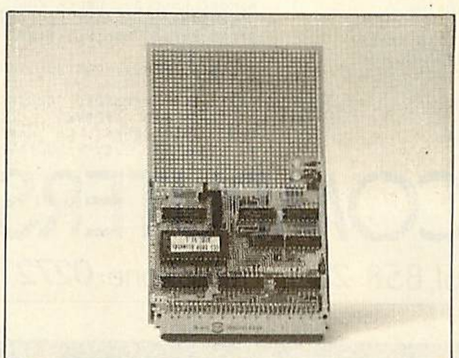
Similarly you can write a value to the user port socket as follows:

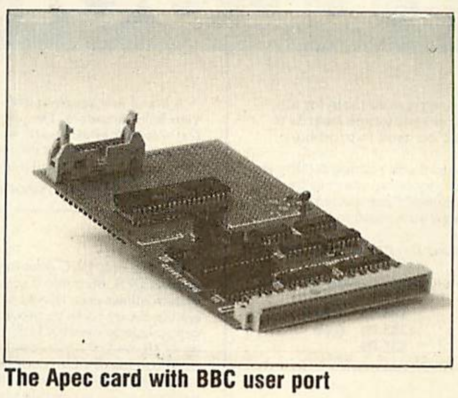
```
SYS "APEC_Write",2,0,
0,value%
```

Note that the SYS "APEC_Sync" statement is only needed once per program to adjust the speed of access – we shall be examining the nature of the different access modes in future articles.



The circuit diagram of the BBC micro-type user port


The complete Apec card – empty


The Apec card with BBC user port

D0 D1 D2 D3 D4 D5 D6 D7	Buffered 8-bit data
A0 A1 A2 A3	Buffered addresses
CLR FIQ CLR IRQ TRIGGER FIQ TRIGGER IRQ ROM FIQ ROM IRQ	Interrupt control
WRITE 0 WRITE 1 WRITE 2 WRITE 3	Block write selects
READ 1 READ 2 READ 3 READ 0	Block read selects

Table 2: Apec prototyping area connections

You have seen the Apec card requires just a few pounds worth of components to provide a platform on which simple Arc expansions can be constructed. A couple of ICs and a socket are all that are required to turn Apec into a BBC micro-style user port.

In next month's offering we will be taking a look at the software side of interfacing your projects to the Archimedes.

We will connect a Concept Keyboard to the BBC-type user port produced in this article and give some software which enables the Concept Keyboard to entirely replace the Arc's normal keyboard.

The Archimedes Prototyping Expansion Card (Apec) is available either as a bare PCB and Eprom or complete and ready-built from Atomwide, 23 The Greenway, Orpington, Kent. Tel: (0689) 38852.

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Snapshot:

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RESTORE MEMORY FROM DISK (i.e. RUN GAME)

PRINT SCREEN AT POINT OF SUSPENDED PROGRAM

SAVE SCREEN AT POINT OF SUSPENDED PROGRAM

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'Although it appears expensive, there is nothing else remotely similar, even on other micros for less.' *BEEBUG* April 88

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'The quality of printing is the last factor which makes Diagram II so outstanding. The package really is capable of producing top quality diagrams.' *ETI* March 88

Diagram II £55.00 P & P free

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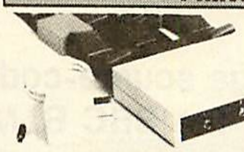
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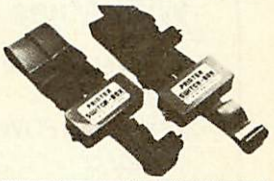


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PS3 3 BBCs to 1 Printer £59.50
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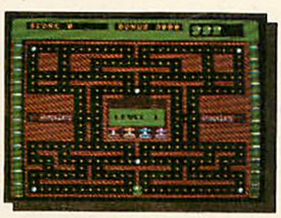
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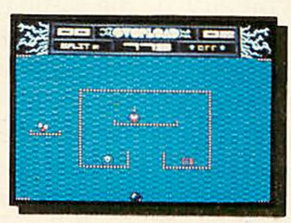
As a fitting reward for this dastardly deed, Igor is sentenced to life imprisonment in a spheroid. But spheroids being the dull places they are, drive Igor to suicide, and the trouble is, the nasties are still on the loose.



Here's where you come in, you are Cheetah, Igor's 11 legged flea. Your job, sort out those evil slime balls! It's not as easy as it looks, however, Frank 'n' Stein's set up a little sabotage of his own and the nasties must now die in the correct order.



And if that isn't bad enough, there's a time limit too. Squash the nasties in the wrong order or exceed the time limit and you could end up... well, it's just too horrible to write about.



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COMPATIBILITY

Program	Page	BBC B	B+/128	Master 128	Master Compact	Electron	Arc	6502SP/ Turbo	ADFS	Econet	Shadow RAM	Monthly T/D
Arc Agora	30											
Listings 1-4							■		■	■	■	■
Hints & Tips	41											
Listing 1(1)		■	■	■	■	■		■	■	■	■	■
Listings 2-3		■	■	■	■	■		■	■	■	■	■
Designer Druids(2)	66											
Listings 1-6		■	■	■	■			■	■	■	■	■
Encoding Basic	71											
Listings 1-2		■	■	■	■	■		■	■	■	■	■
Off the Wall	79											
Listing 1							■			■	■	■
Good Wording	81											
Listing 1(3)		■	■	■	■			■	■	■	■	■

Note 1. Requires View. 2. Requires Basic 2. 3. Requires Wordwise Plus.

ARC AGORA

See Arc Agora, page 30

Listing 1. BBC screen converter

```
   10 REM >Agora1
   20 REM ConvMod source
   30 REM by Dave Acton
   40 REM for Archimedes only
   50 REM (c) BAU August 1989
   60 :
   70 DIM code% &1000
   80 infobase=3:screen=4:bytecols=5
   90 handle=6:count1=7:count2=8
  100 gap=9:tablebase=10:temp=11
  110 double=12:sp=13:link=14:pc=15
  120 PRINT"Assembling code..."
  130 FOR pass%=4 TO 6 STEP 2
  140 P%=0:O%=code%
  150 [OPT pass%
  160 .modeconv
  170 EQUD 0:EQUD 0
  180 EQUD 0:EQUD 0
  190 EQUD title
  200 EQUD help
  210 EQUD commandtable
  220 EQUD 0:EQUD 0
  230 EQUD 0:EQUD 0
  240 :
  250 .title
  260 FNz("ModeConvert")
  270 .help
  280 FNz("ModeConvert"+CHR$(9)+"1.00 ("
+MID$(TIME$,5,11)+")")
  290 :
  300 .commandtable
  310 FNz("LoadBBCScreen")
  320 EQUD lbs
  330 EQUD &0002FF01
  340 EQUD lbssyntax
  350 EQUD lbshelp
  360 FNz("SaveBBCScreen")
  370 EQUD sbs
  380 EQUD &0001FF01
  390 EQUD sbssyntax
  400 EQUD sbshelp
  410 EQUD 0
  420 :
  430 .lbshelp
  440 EQUS "*LoadBBCScreen displays a BB
C/Master graphics screen on the Archimed
es, changing mode if specified"
  450 EQUB 13
  460 .lbssyntax
  470 FNz("Syntax: *LoadBBCScreen <filen
ame> [<mode>]")
  480 .sbshelp
  490 EQUS "*SaveBBCScreen saves the cur
rent Archimedes display as a BBC/Master
screen file"
  500 EQUB 13
  510 .sbssyntax
  520 FNz("Syntax: *SaveBBCScreen <filen
ame>")
  530 :
  540 .lbs
  550 STMFD (sp)!,{link}
  560 BL getname
  570 BL skiptononspace
  580 BLT nomodespecified
  590 SUBS R0,temp,#ASC"0"
  600 BMI badmode
  610 CMP R0,#5
  620 BGT badmode
  630 CMP R0,#3
  640 BEQ badmode
  650 SWI &100+22
  660 SWI "OS_WriteC"
  670 .nomodespecified
  680 MOV R0,#&40
  690 BL setup
  700 LDMVSFD (sp)!,{link}
  710 ORRVSS pc,link,#1<<28
  720 .loadloop1
  730 MOV count2,bytecols,ASL #3
```

Continued ▶

◀ Arc Agora, listing 1 continued

```
740 .loadloop2
750 MOV R1,handle
760 SWI "OS_BGet"
770 BCS closefile
780 LDRB temp,[tablebase,R0]
790 CMP double,#0
800 STREQB temp,[screen]
810 BEQ nostretch
820 LDR R1,[infobase,#4]
830 .stretchloop
840 STMFD (sp)!,{temp}
850 BL stretchit
860 LDMFD (sp)!,{temp}
870 BL stretchit
880 SUBS R1,R1,#1
890 BNE stretchloop
900 STRB R0,[screen]
910 MOV R0,R0,LSR #8
920 STRB R0,[screen,#1]
930 .nostretch
940 ADD screen,screen,gap
950 SUBS count2,count2,#1
960 TST count2,#%111
970 BNE loadloop2
980 SUB screen,screen,gap,ASL #3
990 ADD screen,screen,#1
1000 ADD screen,screen,double
1010 CMP count2,#0
1020 BNE loadloop2
1030 SUB screen,screen,gap
1040 ADD screen,screen,gap,ASL #3
1050 SUBS count1,count1,#1
1060 BNE loadloop1
1070 .closefile
1080 MOV R0,#0
1090 MOV R1,handle
1100 SWI "OS_Find"
1110 LDMFD (sp)!,{pc}
1120 .badmode
1130 ADR R0,notokmode
1140 LDMFD (sp)!,{link}
1150 ORRS pc,link,#1<<28
1160 :
1170 .stretchit
1180 LDR R2,[infobase,#8]
1190 .stretchitloop
1200 MOV R0,R0,LSR #1
1210 MOVS temp,temp,LSR #1
1220 ORRCS R0,R0,#1<<15
1230 SUBS R2,R2,#1
1240 BNE stretchitloop
1250 MOV pc,link
1260 :
1270 .sbs
1280 STMFD (sp)!,{link}
1290 BL getname
1300 MOV R0,#135
1310 SWI "OS_Byte"
1320 CMP R2,#0
1330 BLT badmode
1340 CMP R2,#3
1350 BEQ badmode
1360 CMP R2,#5
1370 BGT badmode
1380 STMFD (sp)!,{R2}
1390 MOV R0,#&80
1400 BL setup
1410 ADD tablebase,tablebase,#&300
1420 .saveloop1
1430 MOV count2,bytecols,ASL #3
1440 .saveloop2
1450 CMP double,#0
1460 LDREQB R0,[screen]
1470 BEQ nosquash
1480 MOV R0,#0
1490 LDRB temp,[screen]
1500 BL squashit
1510 LDRB temp,[screen,#1]
1520 BL squashit
1530 .nosquash
1540 LDRB R0,[tablebase,R0]
1550 MOV R1,handle
1560 SWI "OS_BPut"
1570 ADD screen,screen,gap
1580 SUBS count2,count2,#1
1590 TST count2,#%111
1600 BNE saveloop2
1610 SUB screen,screen,gap,ASL #3
1620 ADD screen,screen,#1
1630 ADD screen,screen,double
1640 CMP count2,#0
1650 BNE saveloop2
1660 SUB screen,screen,gap
1670 ADD screen,screen,gap,ASL #3
1680 SUBS count1,count1,#1
1690 BNE saveloop1
1700 MOV R0,#0
1710 MOV R1,handle
1720 SWI "OS_Find"
1730 MOV R0,#2
1740 ADR R1,name
1750 LDMFD (sp)!,{R2}
1760 CMP R2,#3
1770 MOVGT R2,#&5800
1780 MOVLT R2,#&3000
1790 SWI "OS_File"
1800 MOV R0,#3
1810 ADR R1,name
1820 MOV R3,#0
1830 SWI "OS_File"
1840 LDMFD (sp)!,{pc}
1850 :
1860 .squashit
1870 LDR R1,[infobase,#4]
1880 MOV R1,R1,LSR #1
1890 .squashitloop1
1900 LDR R2,[infobase,#8]
1910 .squashitloop2
1920 MOV R0,R0,LSR #1
1930 MOVS temp,temp,LSR #1
1940 ORRCS R0,R0,#128
1950 SUBS R2,R2,#1
1960 BNE squashitloop2
1970 LDR R2,[infobase,#8]
1980 MOV temp,temp,LSR R2
1990 SUBS R1,R1,#1
2000 BNE squashitloop1
2010 MOV pc,link
2020 :
2030 .setup
2040 STMFD (sp)!,{link}
2050 ADR R1,name
2060 MOV R2,#0
2070 SWI "OS_Find"
2080 CMP R0,#0
2090 ADREQ R0,whatfile
2100 LDMEQFD (sp)!,{link}
2110 ORREQS pc,link,#1<<28
2120 MOV handle,R0
2130 ADR R0,inblock
2140 ADR R1,outblock
2150 SWI "OS_ReadVduVariables"
2160 LDR screen,outblock
2170 MOV R0,#135
2180 SWI "OS_Byte"
2190 ADR infobase,modeinfo
2200 ADD infobase,infobase,R2,ASL #4
2210 ADR tablebase,tables
```

Continued ▶

ARC AGORA

◀ Arc Agora, listing 1 continued

```
2220 AND R2,R2,#3
2230 ADD tablebase,tablebase,R2,ASL #8
2240 LDR double,[infobase]
2250 LDR gap,[infobase,#12]
2260 MOV bytecols,gap,LSR double
2270 MOV count1,#32
2280 LDMFD (sp)!,{pc}
2290 :
2300 .modeinfo
2310 EQUD 0:EQUD 0:EQUD 0:EQUD 80
2320 EQUD 0:EQUD 0:EQUD 0:EQUD 80
2330 EQUD 1:EQUD 2:EQUD 4:EQUD 160
2340 EQUD 0:EQUD 0:EQUD 0:EQUD 0
2350 EQUD 1:EQUD 8:EQUD 1:EQUD 80
2360 EQUD 1:EQUD 4:EQUD 2:EQUD 80
2370 :
2380 .inblock
2390 EQUD 148:EQUD -1
2400 .outblock
2410 EQUD 0:EQUD 0
2420 :
2430 .notokmode
2440 EQUD 27
2450 FNz("Not a valid graphics mode (0,
1,2,4 or 5)")
2460 :
2470 .whatfile
2480 EQUD 27
2490 FNz("No such BBC screen file")
2500 :
2510 .skiptononspace
2520 LDRB temp,[R0]
2530 CMP temp,#32
2540 ADDEQ R0,R0,#1
2550 BEQ skiptononspace
2560 MOV pc,link
2570 :
2580 .getname
2590 STMFD (sp)!,{link}
2600 BL skiptononspace
2610 ADR R1,name
2620 .getnameloop
2630 LDRB temp,[R0]
2640 STRB temp,[R1],#1
2650 CMP temp,#32
2660 ADDGT R0,R0,#1
2670 BGT getnameloop
2680 MOV temp,#13
2690 STRB temp,[R1,#-1]
2700 LDMFD (sp)!,{pc}
2710 ]
2720 name=P%
2730 tables=P%+&100
2740 NEXT pass%
2750 PRINT"Making tables..."
2760 PROCmaketable(O%+&100,8)
2770 PROCmaketable(O%+&200,4)
2780 PROCmaketable(O%+&300,2)
2790 SYS "OS_File",10,"ConvMod",&FFA,,c
ode%,O%+&700
2800 PRINT"Module saved as 'ConvMod'"
2810 END
2820 :
2830 DEF PROCmaketable(table,pix)
2840 FOR b=0 TO 255
2850 g=128:v=0
2860 FOR i=0 TO pix-1
2870 FOR s=8-pix TO 0 STEP -pix
2880 IF b AND (2^(i+s)) THEN v+=g
2890 g=g/2
2900 NEXT
2910 NEXT
2920 table?b=v
2930 table?(&300+v)=b
2940 NEXT
2950 ENDPROC
2960 :
2970 DEF FNz(z$)
2980 [OPT pass%
2990 EQUS z$
3000 EQUB 0
3010 ALIGN
3020 ]
3030 =0
```

Listing 2. Screenmaker

```
10 REM >Agora2
20 REM Creates BBC screen files
30 REM by Dave Acton
40 REM for BBC B/M/C/E (not Arcs!)
50 REM (c) BAU August 1989
60 :
70 REPEAT
80 READ mode%,cols%,res%,size%
90 MODE mode%
100 VDU 29,640;320;
110 clmns%=res%*20
120 PROCc(1,"Mode "+STR$(mode%))
130 PROCc(3,STR$(cols%)+" colours")
140 PROCc(5,STR$(160*res%)+" x 256 pix
els")
150 c%=0
160 FOR s%=0 TO 359 STEP 10
170 GCOL 0,c%
180 MOVE 0,0
190 MOVE 500*COSRAD(s%),300*SINRAD(s%)
200 PLOT 85,500*COSRAD(s%+10),300*SINR
AD(s%+10)
210 c%=(c%+1) MOD cols%
220 NEXT
230 IF mode%>=4 start%=&5800 ELSE star
t%=&3000
240 $&900="SAVE TPic"+STR$(mode%)+" "+
STR$~start%+" 8000"
250 X%=0
260 Y%=9
270 CALL &FFF7
280 UNTIL mode%=5
290 END
300 :
310 DEF PROCc(y%,c$)
320 PRINTTAB((clmns%-LEN(c$))/2,y%)c$
330 ENDPROC
340 :
350 DATA 0,2,4,20
360 DATA 1,4,2,20
370 DATA 2,16,1,20
380 DATA 4,2,2,10
390 DATA 5,4,1,10
```

◀ Arc Agora, listing 3 continued

```
   10 REM >Agora3
   20 REM ConvMod test
   30 REM by Dave Acton
   40 REM for Archimedes
 only
   50 REM (c) BAU August
 1989
   60 :
   70 *RMLOAD ConvMod
   80 REPEAT
   90 FOR mode%=0 TO 5
  100 IF mode%<>3 THEN
  110  MODE mode%
  120  OFF
  130  OSCLI"LoadBBCScre
en TPic"+STR$(mode%)
  140  wait=GET
  150 ENDIF
  160 NEXT
  170 UNTIL FALSE
```

Listing 4. Primes

```
   10 REM >Agora4
   20 REM Prime number g
enerator
   30 REM by Jason O'Bro
in
   40 REM for Archimedes
 only
   50 REM (c) BAU August
 1989
   60 :
   70 DIM code 1000
   80 sp=13:link=14:pc=1
5
   90 FOR pass%=0 TO 2 S
TEP 2
  100 P%=code
  110 [OPT pass%
  120 .buffer
  130 EQUD 0
  140 EQUD 0
  150 EQUD 0
  160 .base
  170 EQUD 0
  180 :
  190 .start
  200 STMFD (sp)!,{link}
  210 LDR R4,base
  220 MOV R6,R4
  230 MOV R5,#2
  240 .gtone
  250 MOV R0,R5
  260 LDR R1,buffer
  270 MOV R2,#8
  280 SWI "XOS_BinaryToD
ecimal"
  290 LDR R0,buffer
  300 MOV R1,R2
  310 SWI "XOS_WriteN"
  320 SWI "XOS_NewLine"
  330 .rpt
  340 STR R5,[R6],#4
  350 CMP R5,#2
  360 ADDNE R5,R5,#2
  370 ADDEQ R5,R5,#1
  380 .calculate
  390 MOV R7,R4
  400 .st
  410 CMP R7,R6
  420 BEQ gtone
  430 B checkprime
  440 .nxt
  450 ADD R7,R7,#4
  460 B st
  470 .checkprime
  480 LDR R8,[R7]
  490 MOV R9,R8
  500 .add
  510 ADD R9,R9,R8
  520 CMP R9,R5
  530 BLT add
  540 BGT nxt
  550 ADD R5,R5,#2
  560 SWI "OS_ReadEscape
State"
  570 BCC calculate
  580 LDMFD (sp)!,{pc}
  590 ]:NEXT pass%
  600 !base=((END+4) DIV
 4)*4
  610 CALL code
```

See Hints & Tips, page 41

Listing 1. Multi columns

```
   10 REM VIEW Splice
   20 REM by Andrew Pill
idge
   30 REM for B/B+/E/M/C
 + VIEW
   40 REM (c) BAU August
 1989
   50 :
   60 MODE 6
   70 elk=1
   80 IF INKEY-256=elk T
HEN mkr1=&0054 ELSE mkr1
=&0053
   90 mkr2=mkr1+2
  100 cpr=&0008
  110 z=&90
  120 FOR pass=0 TO 3 ST
EP 3
  130 P%=&900
  140 [OPT pass
  150 LDY #0
  160 LDA mkr1
  170 STA z
  180 STA z+8
  190 LDA mkr1+1
  200 STA z+1
  210 STA z+9
  220 CMP #0
  230 BNE mark2
  240 RTS
  250 :
  260 .mark2
  270 LDA mkr2
  280 STA z+2
  290 STA z+10
  300 LDA mkr2+1
  310 STA z+3
  320 STA z+11
  330 CMP #0
  340 BNE toploop
  350 RTS
  360 :
  370 .toploop
  380 LDA (z),Y
  390 BEQ top
  400 JSR inctext
  410 JMP toploop
  420 :
  430 .top
  440 JSR inctext
  450 LDA z
  460 STA z+4
  470 STA z+12
  480 LDA z+1
  490 STA z+5
  500 STA z+13
  510 :
  520 LDA z+8
  530 STA z
  540 LDA z+9
  550 STA z+1
  560 :
  570 .loop
  580 LDA (z),Y
  590 STA (z+4),Y
  600 CMP #128
  610 BPL end
  620 CMP #11
  630 BEQ end
  640 JSR inctext
  650 JSR incptr
  660 LDA z
  670 CMP z+2
  680 BNE loop
  690 LDA z+1
  700 CMP z+3
  710 BNE loop
  720 :
  730 .splice
  740 LDA z+8
  750 STA z
  760 LDA z+9
  770 STA z+1
  780 LDA z+12
  790 STA z+4
  800 LDA z+13
  810 STA z+5
  820 LDY #0
  830 :
  840 .text1
  850 LDA (z+4),Y
  860 STA (z),Y
  870 CMP #13
  880 BEQ text2
  890 JSR inctext
  900 JSR incptr
  910 JMP text1
  920 :
  930 .text2
  940 LDA #9
  950 STA (z),Y
  960 JSR inctext
  970 JSR incptr
  980 :
  990 .loopt2
 1000 LDA (z+2),Y
 1010 STA (z),Y
 1020 STA z+6
 1030 JSR inctext
 1040 CLC
 1050 LDA z+2
 1060 ADC #1
 1070 STA z+2
 1080 LDA z+3
 1090 ADC #0
 1100 STA z+3
 1110 LDA z+6
 1120 CMP #13
 1130 BNE loopt2
 1140 :
 1150 LDA z+2
 1160 CMP z
 1170 BNE text1
 1180 LDA z+3
 1190 CMP z+1
 1200 BNE text1
 1210 :
 1220 LDA mkr1
 1230 STA cpr
 1240 LDA mkr1+1
 1250 STA cpr+1
 1260 LDA #0
 1270 STA mkr1
 1280 STA mkr1+1
 1290 STA mkr2
 1300 STA mkr2+2
 1310 .end
 1320 RTS
 1330
 1340 .inctext
 1350 CLC
 1360 LDA z
 1370 ADC #1
 1380 STA z
 1390 LDA z+1
 1400 ADC #0
 1410 STA z+1
 1420 RTS
 1430 :
 1440 .incptr
 1450 CLC
 1460 LDA z+4
 1470 ADC #1
 1480 STA z+4
 1490 LDA z+5
 1500 ADC #0
 1510 STA z+5
 1520 RTS
 1530 ]
 1540 NEXT pass
 1550 :
 1560 *SAVE SPLICE 0900+
E6
```

Listing 2. Hex dump

```
   10 REM Printer Hex Du
mp
   20 REM by David Spenc
er
   30 REM for B/B+/E/M/C
 with BASIC 2
   40 REM (c) BAU August
 1989
   50 :
   60 FOR pass%=0 TO 3 S
TEP 3
   70 P%=&900
   80 [OPT pass%
   90 PHP
  100 SEI
  110 LDA &22D
  120 CMP #us DIV &100
  130 BEQ got
  140 LDA &22C
  150 STA oldv
  160 LDA &22D
  170 STA oldv+1
  180 LDA #us MOD &100
  190 STA &22C
  200 LDA #us DIV &100
  210 STA &22D
  220 .got
  230 LDA #&FF
  240 STA pend
  250 PLP
  260 RTS
  270 :
  280 .us
  290 PHP
  300 CPX #3
  310 BEQ us2
  320 PLP
  330 JMP (oldv)
  340 .us2
  350 PLP
  360 BVC rem
  370 LDX pend
  380 BMI wee
  390 LDA buff,X
  400 CLC
  410 LDX #3
  420 TAY
  430 RTS
  440 .wee
  450 LDX #3
  460 CLV
  470 JMP (oldv)
  480 .rem
  490 LDX pend
  500 BMI empty
  510 LDA buff,X
  520 DEC pend
  530 TAY
  540 CLC
  550 LDX #3
  560 RTS
```

Continued ▶

◀ Hints & Tips, listing 2 continued

```
  570 .empty
  580 JSR call
  590 BCC noe
  600 RTS
  610 .noe
  620 TYA
  630 PHA
  640 LSR A
  650 LSR A
  660 LSR A
  670 LSR A
  680 CMP #10
  690 BCC noadd
  700 ADC #6
  710 .noadd
  720 ADC #&30
  730 STA buff+2
  740 PLA
  750 AND #15
  760 CMP #10
  770 BCC noadd2
  780 ADC #6
  790 .noadd2
  800 ADC #&30
  810 STA buff+1
  820 LDA #32
  830 STA buff
  840 STA buff+3
  850 LDA #3
  860 STA pend
  870 BNE rem
  880 :
  890 .call
  900 CLV
  910 LDX#3
  920 JMP (oldv)
  930 .pend
  940 EQUB 0
  950 .buff
  960 EQUD 0
  970 .oldv
  980 EQUW 0
  990 .end
 1000 ]NEXT
 1010 A$="*SAVE HEXDUMP
FFFF0900+"+STR$~(end-&90
0)
 1020 PRINT A$
 1030 PRINT "Press a key
to save code"
 1040 IF GET
 1050 OSCLI A$
 1060 PRINT "To run, typ
e *RUN HEXDUMP, or *HEXD
UMP"
```

Listing 3. Auto utility

```
   10 REM AUTO extension
   20 REM by Machiel Jan
sen
   30 REM for B/B+/E/M/C
 with BASIC 2
   40 REM (c) BAU August
 1989
   50 :
   60 MODE 6
   70 PROCassemble
   80 *SAVE AUTOSTR FFFF
0900+4E
   90 END
  100
  110 DEF PROCassemble
  120 rdchv =&0210
  130 osbyte=&FFF4
  140 fkey=0
  150 FOR pass=0 TO 2 ST
EP 2
  160 P%=&900
  170 [OPT pass
  180 LDA rdchv+1
  190 CMP #9
  200 BEQ return
  210 STA &50
  220 LDA rdchv
  230 STA &4F
  240 :
  250 LDA #newv MOD 256
  260 STA rdchv
  270 LDA #newv DIV 256
  280 STA rdchv+1
  290  .return
  300 BRK
  310 EQUB 0
  320 EQUS "AUTOSTR Inst
alled."
  330 EQUB 0
  340 :
  350 .newv
  360 PHP
  370 PHA
  380 TXA
  390 PHA
  400 TYA
  410 PHA
  420 :
  430 LDA 4
  440 CMP 6
  450 BEQ end
  460 :
  470 TYA
  480 BNE end
  490 :
  500 LDA #&8A
  510 LDX #0
  520 LDY #&80+fkey
  530 JSR osbyte
  540  .end
  550 PLA
  560 TAY
  570 PLA
  580 TAX
  590 PLA
  600 PLP
  610 JMP (&004F)
  620 ]
  630 NEXT
  640 ENDPROC
```

See Designer Druids, page 66

Listing 1

```
   10 REM >Ed1
   20 REM RuneMaker Edit
or
   30 REM by Chris Rusem
an
   40 REM for BBC B/B+/M
/C
   50 REM (c) BAU August
 1989
   60 :
   70 IF PAGE<>&2700 THE
N PAGE=&2700:CHAIN"Ed1"
   80 L%=&5000
   90 MODE 7
  100 LOMEM=L%
  110 read=&00
  120 write=&02
  130 write2=&04
  140 vect=&06
  150 counter=&08
  160 sprnum=&09
  170 rho=&0A
  180 curspr=&0B
  190 xp=&0C
  200 yp=&0D
  210 xposm=&0C
  220 yposm=&0D
  230 xposs=&0E
  240 yposs=&0F
  250 xposr=&10
  260 yposr=&11
  270 counta=&12
  280 countb=&13
  290 countc=&14
  300 dracula=&15
  310 column=&16
  320 val=&17
  330 gbyte=&18
  340 base=&19
  350 bits=&1B
  360 from=&1C
  370 to=&1E
  380 curmap=&20
  390 edtype=&21
  400 key=&22
  410 zaddr=&23
  420 curcol=&25
  430 colour=&26
  440 rune=&27
  450 amask=&28
  460 byte1=&29
  470 byte2=&2A
  480 usecur=&2B
  490 runes=&70
  500 realy=&2D
  510 xco=&2E
  520 yco=&2F
  530 ymin=&30
  540 oldspr=&31
  550 text=&32
  560 file=&34
  570 byte=&35
  580 :
  590 compacted%=&400
  600 norune=&7C0
  610 osblk=&7E0
  620 cols=&7F2
  630 safedep%=&7F6
  640 final%=&1100
  650 osword=&FFF1
  660 oswrch=&FFEE
  670 osfile=&FFDD
  680 oscli=&FFF7
  690 osrdch=&FFE0
  700 osbyte=&FFF4
  710 osnewl=&FFE7
  720 safemap%=&2220
  730 safespr%=&2280
  740 runes%=&22E0
  750 runex%=&2320
  760 runey%=&2360
  770 screen%=&23A0
  780 scenery%=&2400
  790 depths%=&2F40
  800 :
  810 end=safemap%
  820 mpos%=&3000+640+32
  830 gpos%=&3000+17*640
+2*16
  840 zpos%=&3000+19*640
+14*16
  850 zpos2%=zpos%+4*640
  860 cpos%=&3000+28*640
+14*16
  870 :
  880 PRINT"Assembling c
ode..."
  890 pass%=0
  900 FOR Z%=0 TO &7D:Z%
?&900=Z%?&482:NEXT
  910 ?&97E=?2:?&97F=?3
  920 CHAIN"Ed2"
```

Listing 2

```
   10 REM >Ed2
   20 REM by CSR - BAU 1
989
   30 :
   40 LOMEM=L%
   50 FOR Z%=0 TO &7D:Z%
?&482=Z%?&900:NEXT
   60 ?2=?&97E:?3=?&97F
   70 P%=final%
   80 PRINTCHR$13"Listin
g 2, pass ";pass%;
   90 [OPT pass%
  100 .dredit
  110 SEI
  120 LDA #error MOD 256
  130 STA &202
  140 LDA #error DIV 256
  150 STA &203
  160 CLI
  170 LDX #2
  180 JSR mode
  190 JSR coff
  200 LDX #edvdus% MOD 2
56
  210 LDY #edvdus% DIV 2
56
  220 JSR prstr
  230 JSR coff
  240 LDY #8
  250 .setpal
  260 LDX palette,Y
  270 JSR vdu19
  280 DEY
  290 BPL setpal
  300 LDY #0
  310 .setgrass
  320 LDA grass%,Y
  330 STA gpos%,Y
  340 LDA grass%+&100,Y
  350 STA gpos%+&100,Y
  360 LDA grass%+&140,Y
  370 STA gpos%+&140,Y
  380 DEY
  390 BNE setgrass
  400 LDA #4
  410 LDX #1
  420 JSR osbyte
  430 LDA #229
  440 LDX #1
  450 JSR osbyte
  460 LDA #225
  470 LDX #140
  480 JSR osbyte
  490 LDA #compacted% DI
V 256
  500 LDX #4
  510 JSR clear
  520 LDA #scenery% DIV
256
  530 LDX #12
  540 JSR clear
  550 LDA #&FF
  560 LDY #&C0
  570 .setff
  580 STA runes%-1,Y
  590 STA depths%-1,Y
  600 DEY
  610 BNE setff
  620 LDA #7
  630 STA curcol
  640 LDA #0
  650 STA xposm
  660 STA yposm
  670 STA xposs
  680 STA yposs
  690 STA xposr
  700 STA yposr
  710 STA curspr
  720 STA column
  730 STA curmap
  740 STA edtype
  750 STA runes
  760 JSR showss
  770 JSR newspr
  780 JSR zoom
  790 JSR mapinfo
  800 JSR runeinfo
  810 JSR showcol
  820 JSR load
  830 .mainloop
  840 LDA #0
  850 STA key
  860 .getakey
  870 JSR cursor
  880 LDX #50
  890 JSR inkey
  900 STX key
  910 JSR cursor
  920 LDX key
  930 CPX #0
  940 BNE gotakey
  950 LDX #20
  960 JSR inkey
  970 STX key
  980 CPX #0
  990 BEQ getakey
 1000 .gotakey
 1010 TXA
 1020 LDX #0
 1030 .checkkeys
 1040 LDY keys,X
 1050 BEQ mainloop
 1060 CMP keys,X
 1070 BEQ validkey
 1080 INX
 1090 INX
 1100 INX
 1110 BNE checkkeys
 1120 .validkey
 1130 LDA keys+1,X
 1140 STA vect
 1150 LDA keys+2,X
 1160 STA vect+1
 1170 JSR indir
 1180 LDX #256-74
 1190 JSR negink
 1200 BNE notret
 1210 JSR return
 1220 .notret
 1230 LDX #256-90
 1240 JSR negink
 1250 BNE mainloop
 1260 JSR delete
 1270 JMP mainloop
 1280 .esc
 1290 LDX #256-1
 1300 JSR negink
 1310 BEQ escape
 1320 RTS
 1330 .escape
 1340 LDA #4
 1350 LDX #0
 1360 JSR osbyte
 1370 LDA #229
 1380 LDX #0
 1390 JSR osbyte
 1400 LDA #225
 1410 LDX #1
```

Continued ▶

◀ Designer Druids, listing 2 continued

```
1420 JSR osbyte
1430 LDX #7
1440 JSR mode
1450 LDX #bas MOD 256
1460 LDY #bas DIV 256
1470 JMP oscli
1480 :
1490 .mode
1500 LDA #22
1510 JSR oswrch
1520 TXA
1530 JMP oswrch
1540 :
1550 .clear
1560 STA to+1
1570 LDA #0
1580 STA to
1590 TAY
1600 .cloop
1610 STA (to),Y
1620 DEY
1630 BNE cloop
1640 INC to+1
1650 DEX
1660 BNE cloop
1670 RTS
1680 :
1690 .null
1700 RTS
1710 :
1720 .negink
1730 LDA #129
1740 LDY #&FF
1750 JSR osbyte
1760 CPX #&FF
1770 RTS
1780 :
1790 .inkey
1800 LDA #129
1810 LDY #0
1820 JSR osbyte
1830 BCC gotinkey
1840 LDX #0
1850 .gotinkey
1860 RTS
1870 :
1880 .vdu19
1890 LDA #155
1900 JMP osbyte
1910 :
1920 .indir
1930 JMP (vect)
1940 :
1950 .icol
1960 LDX curcol
1970 LDA clo%,X
1980 STA to
1990 LDA chi%,X
2000 STA to+1
2010 LDY #23
2020 RTS
2030 :
2040 .transp
2050 LDA #6
2060 BNE newcol
2070 :
2080 .colnum
2090 LDA key
2100 SEC
2110 SBC #48
2120 .newcol
2130 PHA
2140 JSR delcol
2150 PLA
2160 JMP setcol
2170 :
2180 .deccol
2190 LDA #255
2200 BNE addcol
2210 :
2220 .inccol
2230 LDA #1
2240 .addcol
2250 PHA
2260 JSR delcol
2270 PLA
2280 CLC
2290 ADC curcol
2300 AND #7
2310 .setcol
2320 STA curcol
2330 .showcol
2340 JSR icol
2350 .scloop
2360 LDA (to),Y
2370 ORA ormask,Y
2380 STA (to),Y
2390 DEY
2400 BPL scloop
2410 RTS
2420 :
2430 .delcol
2440 JSR icol
2450 .dcloop
2460 LDA (to),Y
2470 AND andmask,Y
2480 STA (to),Y
2490 DEY
2500 BPL dcloop
2510 RTS
2520 :
2530 .ednum
2540 LDA key
2550 SEC
2560 SBC #140
2570 ASL A
2580 STA edtype
2590 RTS
2600 :
2610 .cursor
2620 LDA edtype
2630 BEQ mapcurs
2640 CMP #2
2650 BEQ sprcurs
2660 LDA #runedat MOD 2
56
2670 STA read
2680 LDA #runedat DIV 2
56
2690 STA read+1
2700 LDA #&FF
2710 STA amask
2720 LDA xposr
2730 CLC
2740 ADC #4
2750 TAX
2760 LDA yposr
2770 CLC
2780 ADC #8
2790 TAY
2800 LDA #4
2810 JMP showl
2820 :
2830 .sprcurs
2840 JSR dozpos
2850 LDY #0
2860 JSR doeor
2870 LDY #8
2880 .doeor
2890 LDX #4
2900 .eorloop
2910 LDA (zaddr),Y
2920 EOR #&3F
2930 STA (zaddr),Y
2940 INY
2950 DEX
2960 BNE eorloop
2970 RTS
2980 :
2990 .dozpos
3000 LDA yposs
3010 LSR A
3020 TAX
3030 LDA xposs
3040 ASL A
3050 ASL A
3060 ASL A
3070 ASL A
3080 ADC zlo%,X
3090 STA zaddr
3100 LDA #0
3110 ADC zhi%,X
3120 STA zaddr+1
3130 LDA yposs
3140 AND #1
3150 ASL A
3160 ASL A
3170 ADC zaddr
3180 STA zaddr
3190 RTS
3200 :
3210 .mapcurs
3220 LDA #25
3230 JSR oswrch
3240 LDA #4
3250 JSR oswrch
3260 LDX xposm
3270 LDA sprlo%,X
3280 CLC
3290 ADC #56
3300 PHP
3310 JSR oswrch
3320 LDA #(256-(scenery
% DIV 256))
3330 PLP
3340 ADC sprhi%,X
3350 JSR oswrch
3360 LDA #0
3370 STA bytel
3380 LDA yposm
3390 LSR A
3400 ROR bytel
3410 LSR A
3420 ROR bytel
3430 STA byte2
3440 LDA #(1023-28) MOD
256
3450 SEC
3460 SBC bytel
3470 PHP
3480 JSR oswrch
3490 PLP
3500 LDA #(1023-28) DIV
256
3510 SBC byte2
3520 JSR oswrch
3530 LDA #8
3540 STA boxcol
3550 JMP drawbox
3560 :
3570 .mleft
3580 LDA #255
3590 BNE newmap
3600 :
3610 .mright
3620 LDA #1
3630 .newmap
3640 PHA
3650 JSR putmap
3660 PLA
3670 CLC
3680 ADC curmap
3690 AND #&F
3700 STA curmap
3710 .mapinfo
3720 JSR getmap
3730 JSR drawmap
3740 LDX #8
3750 LDY #30
3760 JSR tab
3770 LDA curmap
3780 CLC
3790 ADC #65
3800 JSR oswrch
3810 :
3820 .tab
3830 STX tabblk+1
3840 STY tabblk+2
3850 LDX #tabblk MOD 25
6
3860 LDY #tabblk DIV 25
6
3870 JMP prstr
3880 :
3890 .sleft
3900 DEC column
3910 BMI lwrap
3920 LDA #255
3930 BNE lefrig
3940 .lwrap
3950 LDA #5
3960 STA column
3970 BNE lefrig
3980 :
3990 .sright
4000 INC column
4010 LDA column
4020 CMP #6
4030 BEQ rwrap
4040 LDA #1
4050 BNE lefrig
4060 .rwrap
4070 LDA #0
4080 STA column
4090 LDA #256-5
4100 .lefrig
4110 PHA
4120 JSR scurs
4130 PLA
4140 CLC
4150 ADC curspr
4160 STA curspr
4170 JSR zoom
4180 JMP newspr
4190 :
4200 .sdown
4210 LDA #6
4220 BNE updown
4230 :
4240 .sup
4250 LDA #30-6
4260 .updown
4270 PHA
4280 JSR scurs
4290 PLA
4300 CLC
4310 ADC curspr
4320 CMP #30
4330 BCC nowrap
4340 SBC #30
4350 .nowrap
4360 STA curspr
4370 JSR zoom
4380 .newspr
4390 LDX curspr
4400 LDA sprlo%,X
4410 STA from
4420 LDA sprhi%,X
4430 STA from+1
4440 LDY #95
4450 .nsloop
4460 LDA (from),Y
4470 STA safespr%,Y
4480 DEY
4490 BPL nsloop
4500 LDA curspr
4510 ASL A
4520 ADC curspr
4530 ASL A
4540 TAX
4550 LDY #5
4560 .sdloop
4570 LDA depths%,X
4580 STA safedep%,Y
4590 INX
4600 DEY
4610 BPL sdloop
4620 .scurs
4630 LDA #7
4640 STA boxcol
4650 LDA #25
4660 JSR oswrch
4670 LDA #4
4680 JSR oswrch
4690 LDA #0
4700 STA byte
4710 LDX curspr
4720 LDA xtab%,X
4730 ASL A
4740 SEC
4750 SBC #1
4760 ASL A
4770 ROL byte
4780 ASL A
4790 ROL byte
4800 ASL A
4810 ROL byte
4820 JSR oswrch
4830 LDA byte
4840 JSR oswrch
4850 LDA #0
4860 STA byte
4870 SEC
4880 SBC ytab%,X
4890 ASL A
4900 ROL byte
4910 ASL A
4920 ROL byte
4930 JSR oswrch
4940 LDA byte
4950 JSR oswrch
4960 .drawbox
4970 LDX #box MOD 256
4980 LDY #box DIV 256
4990 .prstr
5000 STX vect
5010 STY vect+1
5020 LDY #0
5030 .prloop
5040 LDA (vect),Y
5050 CMP #254
5060 BEQ prdone
5070 JSR oswrch
5080 INY
5090 BNE prloop
5100 INC vect+1
5110 BNE prloop
5120 .prdone
5130 RTS
5140 :
5150 .cleft
5160 LDA #255
5170 BNE clr
5180 :
5190 .cright
5200 LDA #1
5210 .clr
5220 LDX edtype
5230 CLC
5240 ADC xp,X
5250 BPL lrnotneg
5260 ADC xmax,X
5270 CPX #0
5280 BNE clrok
5290 STA xp,X
5300 JMP mleft
5310 .lrnotneg
5320 CMP xmax,X
5330 BNE clrok
5340 LDA #0
5350 CPX #0
5360 BNE clrok
5370 STA xp,X
5380 JMP mright
5390 .clrok
5400 STA xp,X
5410 RTS
5420 :
5430 .cdown
5440 LDA #1
5450 BNE cdu
5460 :
5470 .cup
5480 LDA #255
5490 .cdu
5500 LDX edtype
5510 CLC
5520 ADC yp,X
5530 BPL dunotneg
5540 ADC ymax,X
5550 BNE cduok
5560 .dunotneg
5570 CMP ymax,X
5580 BNE cduok
5590 LDA #0
5600 .cduok
5610 STA yp,X
5620 RTS
5630 ]
5640 FOR Z%=0 TO &7D:Z%
?&900=Z%?&482:NEXT
5650 ?&97E=?2:?&97F=?3
5660 CHAIN"Ed3"
```

Listing 3

```
10 REM >Ed3
20 REM by CSR - BAU 1
989
30 :
40 LOMEM=L%
50 FOR Z%=0 TO &7D:Z%
?&482=Z%?&900:NEXT
60 ?2=?&97E:?3=?&97F
70 PRINTCHR$13"Listin
g 3, pass ";pass%;
80 [OPT pass%
90 .runedel
100 LDA #&3F
110 STA amask
120 \ A happens to con
tain 63!
130 STA rune
140 .findit
150 LDY rune
160 LDA runes%,Y
```

Continued ▶

◀ Designer Druids, listing 3 continued

```
170 CMP curmap
180 BNE noway
190 LDA runex%,Y
200 CLC
210 ADC #3
220 SEC
230 SBC xposr
240 CMP #7
250 BCS noway
260 LDA runey%,Y
270 CLC
280 ADC #7
290 SEC
300 SBC realy
310 CMP #15
320 BCS noway
330 LDA #norune MOD 25
6
340 STA read
350 LDA #norune DIV 25
6
360 STA read+1
370 JSR onerune
380 LDY rune
390 LDA #255
400 STA runex%,Y
410 STA runes%,Y
420 DEC runes
430 .noway
440 DEC rune
450 BPL findit
460 JMP showrunes
470 :
480 .runeret
490 LDA yposr
500 ORA #128
510 STA realy
520 CPX #0
530 BEQ runedel
540 LDA runes
550 CMP #64
560 BNE isroom
570 LDA #20
580 JMP ping
590 .isroom
600 LDY #63
610 .findgap
620 LDA runex%,Y
630 BMI gotgap
640 DEY
650 BPL findgap
660 .gotgap
670 INC runes
680 LDA curmap
690 STA runes%,Y
700 LDA xposr
710 STA runex%,Y
720 LDA realy
730 STA runey%,Y
740 JMP showrunes
750 :
760 .delete
770 LDX #0
780 BEQ place
790 :
800 .return
810 LDX #1
820 .place
830 STX usecur
840 LDA edtype
850 BEQ mapret
860 CMP #4
870 BEQ runeret
880 .sprret
890 LDA xposs
900 LSR A
910 STA xco
920 LDA yposs
930 STA yco
940 JSR dozpos
950 LDA zaddr
960 STA write2
970 LDA zaddr+1
980 STA write2+1
990 LDA #0
1000 LDX usecur
1010 BEQ nocol
1020 LDX curcol
1030 .nocol
1040 STX colour
1050 JSR jsrdo4
1060 LDY curspr
1070 LDA sprlo%,Y
1080 STA from
1090 LDA sprhi%,Y
1100 STA from+1
1110 LDA yposs
1120 LSR A
1130 LSR A
1140 LSR A
1150 TAY
1160 LDA yposs
1170 AND #7
1180 CLC
1190 ADC mul48,Y
1200 STA byte
1210 LDA xposs
1220 AND #&E
1230 ASL A
1240 ASL A
1250 ADC byte
1260 TAY
1270 LDX colour
1280 LDA colbits,X
1290 STA byte
1300 LDA xposs
1310 AND #1
1320 TAX
1330 BNE noasl
1340 ASL byte
1350 .noasl
1360 LDA (from),Y
1370 AND masks,X
1380 ORA byte
1390 STA (from),Y
1400 .redraw
1410 JSR asprin
1420 LDX #95
1430 .chkscr
1440 LDY screen%,X
1450 CPY curspr
1460 BNE notmesir
1470 JSR zapone
1480 .notmesir
1490 DEX
1500 BPL chkscr
1510 JMP showrunes
1520 :
1530 .mapret
1540 LDA yposm
1550 ASL A
1560 ASL A
1570 STA byte
1580 ASL A
1590 ADC byte
1600 ADC xposm
1610 TAY
1620 TAX
1630 LDA usecur
1640 BEQ nospr
1650 LDA curspr
1660 .nospr
1670 STA screen%,Y
1680 TAY
1690 JSR zapone
1700 JMP showrunes
1710 :
1720 .dellev
1730 LDY #255
1740 BNE newlev
1750 :
1760 .setlev
1770 LDY yposs
1780 .newlev
1790 LDA edtype
1800 CMP #2
1810 BEQ levok
1820 RTS
1830 .levok
1840 LDA xposs
1850 LSR A
1860 STA xco
1870 LDA curspr
1880 ASL A
1890 ADC curspr
1900 ASL A
1910 ADC xco
1920 TAX
1930 TYA
1940 STA depths%,X
1950 .zoom
1960 LDX curspr
1970 LDA sprlo%,X
1980 STA read
1990 LDA sprhi%,X
2000 STA read+1
2010 LDX #zpos% MOD 256
2020 LDY #zpos% DIV 256
2030 LDA #0
2040 .zloop1
2050 STA ymin
2060 STX write
2070 STY write+1
2080 LDA #0
2090 STA xco
2100 .zloop2
2110 LDA ymin
2120 STA yco
2130 LDA write
2140 STA write2
2150 LDA write+1
2160 STA write2+1
2170 .zloop3
2180 LDY #0
2190 STY byte1
2200 STY byte2
2210 LDA (read),Y
2220 LDX #4
2230 .asloop
2240 ASL A
2250 ROL byte1
2260 ASL A
2270 ROL byte2
2280 DEX
2290 BNE asloop
2300 LDX byte1
2310 LDA #0
2320 JSR jsrdo4
2330 LDX byte2
2340 LDA #16
2350 JSR jsrdo4
2360 INC read
2370 BNE nrh
2380 INC read+1
2390 .nrh
2400 LDA yco
2410 AND #1
2420 BEQ even
2430 LDA write2
2440 CLC
2450 ADC #636 MOD 256
2460 STA write2
2470 LDA write2+1
2480 ADC #636 DIV 256
2490 STA write2+1
2500 JMP odd
2510 .even
2520 LDA write2
2530 CLC
2540 ADC #4
2550 STA write2
2560 BCC odd
2570 INC write2+1
2580 .odd
2590 INC yco
2600 LDA yco
2610 AND #7
2620 BNE zloop3
2630 LDA write
2640 CLC
2650 ADC #32
2660 STA write
2670 BCC nwh
2680 INC write+1
2690 .nwh
2700 INC xco
2710 LDA xco
2720 CMP #6
2730 BNE zloop2
2740 LDA yco
2750 CMP #16
2760 BNE botline
2770 RTS
2780 .botline
2790 LDX #zpos2% MOD 25
6
2800 LDY #zpos2% DIV 25
6
2810 JMP zloop1
2820 :
2830 .jsrdo4
2840 PHA
2850 TAY
2860 LDA coltab,X
2870 LDX #3
2880 .defcol
2890 STA cols,X
2900 DEX
2910 BPL defcol
2920 CMP #&2A
2930 BNE nodith
2940 LDA #&15
2950 STA cols
2960 STA cols+2
2970 .nodith
2980 LDA curspr
2990 ASL A
3000 STA byte
3010 ASL A
3020 ADC byte
3030 ADC xco
3040 TAX
3050 LDA depths%,X
3060 CMP yco
3070 BNE notdep
3080 LDA #&18
3090 STA cols+2
3100 LDA #&24
3110 STA cols+3
3120 .notdep
3130 JSR do4
3140 PLA
3150 CLC
3160 ADC #8
3170 TAY
3180 .do4
3190 LDX #3
3200 .do4loop
3210 LDA cols,X
3220 STA (write2),Y
3230 INY
3240 DEX
3250 BPL do4loop
3260 RTS
3270 :
3280 .calcaddr
3290 LDA lo2%,X
3300 STA write
3310 LDA hi2%,X
3320 STA write+1
3330 TYA
3340 LSR A
3350 LSR A
3360 LSR A
3370 TAX
3380 TYA
3390 AND #7
3400 STA countb
3410 ORA lo%,X
3420 CLC
3430 ADC write
3440 STA write
3450 LDA hi%,X
3460 ADC write+1
3470 STA write+1
3480 LDY #0
3490 RTS
3500 :
3510 .showss
3520 LDA #29
3530 STA sprnum
3540 .shloop
3550 LDX sprnum
3560 JSR asprinx
3570 DEC sprnum
3580 BPL shloop
3590 RTS
3600 :
3610 .asprin
3620 LDX curspr
3630 .asprinx
3640 LDA sprlo%,X
3650 STA read
3660 LDA sprhi%,X
3670 STA read+1
3680 LDY ytab%,X
3690 STY byte2
3700 LDA xtab%,X
3710 STA byte1
3720 TAX
3730 JSR show
3740 LDA read
3750 CLC
3760 ADC #48
3770 STA read
3780 BCC rnh
3790 INC read+1
3800 .rnh
3810 LDX byte1
3820 LDA byte2
3830 CLC
3840 ADC #8
3850 TAY
3860 .show
3870 LDA #0
3880 STA amask
3890 LDA #6
3900 .show1
3910 STA counter
3920 JSR calcaddr
3930 LDA countb
3940 EOR #7
3950 STA counta
3960 LDA write
3970 CLC
3980 ADC #(640-8) MOD 2
56
3990 STA write2
4000 LDA write+1
4010 ADC #(640-8) DIV 2
56
4020 STA write2+1
4030 .show2
4040 LDX counta
4050 .show2a
4060 LDA (write),Y
4070 AND amask
4080 EOR (read),Y
4090 STA (write),Y
4100 INY
4110 DEX
4120 BPL show2a
4130 LDX countb
4140 BEQ noshow2b
4150 .show2b
4160 LDA (write2),Y
4170 AND amask
4180 EOR (read),Y
4190 STA (write2),Y
4200 INY
4210 DEX
4220 BNE show2b
4230 .noshow2b
4240 DEC counter
4250 BNE show2
4260 RTS
4270 :
4280 .onerune
4290 LDA runex%,Y
4300 CLC
4310 ADC #4
4320 TAX
4330 LDA runey%,Y
4340 SEC
4350 SBC #120
4360 TAY
4370 LDA #4
4380 BNE show1
4390 :
4400 .imap
4410 LDX curmap
4420 LDA maplo%,X
4430 STA base
4440 LDA maphi%,X
4450 STA base+1
4460 RTS
4470 :
4480 .getmap
4490 JSR imap
4500 LDA #1
4510 STA bits
4520 LDY #0
4530 .gsloop
4540 STY counta
4550 LDX #5
4560 LDY #0
4570 STY val
4580 .bgetloop
4590 DEC bits
4600 BNE dontincdb
4610 LDA #8
4620 STA bits
4630 LDA (base),Y
4640 STA gbyte
4650 INC base
4660 BNE dontincdb
4670 INC base+1
4680 .dontincdb
4690 LSR gbyte
4700 ROR val
```

Continued ▶

◀ Designer Druids, listing 3 continued

```
4710 DEX
4720 BNE bgetloop
4730 LDY counta
4740 LDA val
4750 LSR A
4760 LSR A
4770 LSR A
4780 STA screen%,Y
4790 STA safemap%,Y
4800 INY
4810 CPY #96
4820 BNE gsloop
4830 RTS
4840 :
4850 .drawmap
4860 LDX #95
4870 .mloop
4880 LDY screen%,X
4890 JSR zapone
4900 DEX
4910 BPL mloop
4920 .showrunes
4930 LDA #&3F
4940 STA amask
4950 STA rune
4960 .srloop
4970 LDY rune
4980 LDA runes%,Y
4990 CMP curmap
5000 BNE runeless
5010 LDA #(runedat MOD
256)
5020 STA read
5030 LDA #(runedat DIV
256)
5040 STA read+1
5050 JSR onerune
5060 .runeless
5070 DEC rune
5080 BPL srloop
5090 .runeinfo
5100 LDX #11
5110 LDY #30
5120 JSR tab
5130 LDA #64
5140 SEC
5150 SBC runes
5160 .decimal
5170 STA val
5180 LDY #0
5190 .dec1
5200 LDX #8
5210 LDA #0
5220 .dec2
5230 ASL val
5240 ROL A
5250 CMP #10
5260 BCC dec3
5270 SBC #10
5280 INC val
5290 .dec3
5300 DEX
5310 BNE dec2
5320 PHA
5330 INY
5340 LDA val
5350 BNE dec1
5360 CPY #2
5370 BEQ shownum
5380 LDA #32
5390 JSR oswrch
5400 .shownum
5410 PLA
5420 EOR #48
5430 JSR oswrch
5440 DEY
5450 BNE shownum
5460 RTS
5470 :
5480 .zapone
5490 LDA scrlo%,X
5500 STA to
5510 LDA scrhi%,X
5520 STA to+1
5530 LDA sprlo%,Y
5540 STA from
5550 LDA sprhi%,Y
5560 STA from+1
5570 LDY #0
5580 ]
5590 FOR s%=0 TO 47
5600 [OPT pass%
5610 LDA (from),Y
5620 STA (to),Y
5630 INY
5640 ]NEXT s%
5650 [OPT pass%
5660 LDA to
5670 CLC
5680 ADC #(640-48) MOD
256
5690 STA to
5700 LDA to+1
5710 ADC #(640-48) DIV
256
5720 STA to+1
5730 ]
5740 FOR s%=0 TO 47
5750 [OPT pass%
5760 LDA (from),Y
5770 STA (to),Y
5780 INY
5790 ]NEXT s%
5800 [OPT pass%
5810 RTS
5820 :
5830 .putmap
5840 JSR imap
5850 LDA #0
5860 STA byte
5870 STA counta
5880 STA countb
5890 LDA #8
5900 STA bits
5910 .pmloop1
5920 LDY counta
5930 LDA screen%,Y
5940 LDX #5
5950 .pmloop2
5960 LSR A
5970 ROR byte
5980 DEC bits
5990 BNE nobyte
6000 PHA
6010 LDY countb
6020 LDA byte
6030 STA (base),Y
6040 LDA #8
6050 STA bits
6060 INC countb
6070 PLA
6080 .nobyte
6090 DEX
6100 BNE pmloop2
6110 INC counta
6120 LDA counta
6130 CMP #96
6140 BNE pmloop1
6150 RTS
6160 :
6170 .source
6180 LDA curspr
6190 STA oldspr
6200 LDA #40
6210 .ping
6220 STA pitch
6230 LDX #sound MOD 256
6240 LDY #sound DIV 256
6250 LDA #7
6260 JMP osword
6270 ]
6280 FOR Z%=0 TO &7D:Z%
?&900=Z%?&482:NEXT
6290 ?&97E=?2:?&97F=?3
6300 CHAIN"Ed4"
6310 :
6320 DEF FNdef(size)
6330 P%=P%+size
6340 =P%-size
```

Listing 4

```
10 REM >Ed4
20 REM by CSR - BAU 1
989
30 :
40 LOMEM=L%
50 FOR Z%=0 TO &7D:Z%
?&482=Z%?&900:NEXT
60 ?2=?&97E:?3=?&97F
70 PRINTCHR$13"Listin
g 4, pass ";pass%;
80 [OPT pass%
90 .copy
100 LDX oldspr
110 LDA sprlo%,X
120 STA from
130 LDA sprhi%,X
140 STA from+1
150 JSR setsad
160 LDY #95
170 .copys
180 LDA (from),Y
190 STA (to),Y
200 DEY
210 BPL copys
220 LDA oldspr
230 ASL A
240 STA byte
250 ASL A
260 ADC byte
270 TAX
280 LDA curspr
290 ASL A
300 STA byte
310 ASL A
320 ADC byte
330 TAY
340 LDA #6
350 STA counta
360 .copyd
370 LDA depths%,Y
380 STA depths%,X
390 INY
400 INX
410 DEC counta
420 BNE copyd
430 JSR zoom
440 JSR drawmap
450 JSR asprin
460 LDX oldspr
470 JSR asprinx
480 LDA #153
490 JMP ping
500 :
510 .wipe
520 LDA edtype
530 BEQ mapwipe
540 CMP #4
550 BEQ runewipe
560 JSR setsad
570 LDX curcol
580 LDA colbits,X
590 ASL A
600 ORA colbits,X
610 LDY #95
620 .swloop
630 STA (to),Y
640 DEY
650 BPL swloop
660 LDA curspr
670 ASL A
680 STA byte
690 ASL A
700 ADC byte
710 TAX
720 LDY #6
730 LDA #&FF
740 .dploop
750 STA depths%,X
760 INX
770 DEY
780 BNE dploop
790 JSR asprin
800 JSR zoom
810 JMP drawmap
820 :
830 .mapwipe
840 LDY #95
850 LDA curspr
860 .mwloop
870 STA screen%,Y
880 DEY
890 BPL mwloop
900 .runewipe
910 LDY #63
920 .rwloop
930 LDA runes%,Y
940 CMP curmap
950 BNE elsewhere
960 LDA #255
970 STA runes%,Y
980 STA runex%,Y
990 DEC runes
1000 .elsewhere
1010 DEY
1020 BPL rwloop
1030 JSR runeinfo
1040 JMP drawmap
1050 :
1060 .undo
1070 LDA edtype
1080 BEQ mapundo
1090 CMP #2
1100 BEQ sprundo
1110 RTS
1120 .mapundo
1130 LDY #95
1140 .muloop
1150 LDA safemap%,Y
1160 STA screen%,Y
1170 DEY
1180 BPL muloop
1190 LDA #200
1200 JSR ping
1210 JMP drawmap
1220 :
1230 .sprundo
1240 JSR setsad
1250 LDY #95
1260 .nsloop
1270 LDA safespr%,Y
1280 STA (to),Y
1290 DEY
1300 BPL nsloop
1310 LDA curspr
1320 ASL A
1330 ADC curspr
1340 ASL A
1350 TAX
1360 LDY #5
1370 .gdloop
1380 LDA safedep%,Y
1390 STA depths%,X
1400 INX
1410 DEY
1420 BPL gdloop
1430 JMP rezoom
1440 :
1450 .load
1460 LDA #21
1470 LDX #6
1480 LDY #21
1490 JSR getnames
1500 BCC restore
1510 LDA #255
1520 JSR dofiles
1530 LDY #63
1540 LDX #0
1550 .countr
1560 LDA runex%,Y
1570 BMI nope
1580 INX
1590 .nope
1600 DEY
1610 BPL countr
1620 STX runes
1630 .reprint
1640 JSR getmap
1650 JSR showss
1660 JSR zoom
1670 .restore
1680 LDA #26
1690 JSR oswrch
1700 JMP drawmap
1710 :
1720 .save
1730 LDA #21
1740 LDX runes
1750 CPX #64
1760 BEQ nowarn
1770 LDA #6
1780 .nowarn
1790 LDX #21
1800 LDY #6
1810 JSR getnames
1820 BCC restore
1830 LDA #0
1840 JSR dofiles
1850 JMP restore
1860 :
1870 .getnames
1880 STX v1
1890 STY v2
1900 STA v3
1910 LDX #fmess MOD 256
1920 LDY #fmess DIV 256
1930 JSR prstr
1940 JSR con
1950 LDX #0
1960 .newstr
1970 LDA strlo,X
1980 STA text
1990 LDA strhi,X
2000 STA text+1
2010 LDY #0
2020 .findend
2030 LDA (text),Y
2040 INY
2050 CMP #32
2060 BNE findend
2070 DEY
2080 LDA #31
2090 JSR oswrch
2100 TYA
2110 CLC
2120 ADC #7
2130 JSR oswrch
2140 LDA messy,X
2150 JSR oswrch
2160 .gettext
2170 JSR osrdch
2180 CMP #27
2190 BEQ cancel
2200 CMP #127
2210 BEQ del
2220 CMP #9
2230 BEQ done
2240 CMP #13
2250 BEQ godown
2260 CMP #138
2270 BEQ godown
2280 CMP #139
2290 BEQ goup
2300 CMP #33
2310 BCC gettext
2320 CMP #126
2330 BCS gettext
2340 CPY #7
2350 BEQ gettext
2360 JSR oswrch
2370 STA (text),Y
2380 INY
2390 BNE gettext
2400 .del
2410 CPY #0
2420 BEQ gettext
2430 JSR oswrch
2440 DEY
2450 LDA #32
2460 STA (text),Y
2470 BNE gettext
2480 .godown
2490 INX
2500 CPX #3
2510 BNE newstr
2520 LDX #0
2530 BEQ newstr
2540 .goup
2550 DEX
2560 BPL newstr
2570 LDX #2
```

Continued ▶

YELLOW PAGES

GAMES

◀ Designer Druids, listing 4 continued

```
2580 BNE newstr
2590 .cancel
2600 CLC
2610 BCC quit
2620 .done
2630 SEC
2640 .quit
2650 PHP
2660 LDX #normcols MOD 256
2670 LDY #normcols DIV 256
2680 JSR prstr
2690 JSR coff
2700 PLP
2710 RTS
2720 :
2730 .con
2740 LDX #96
2750 BNE onoff
2760 :
2770 .coff
2780 LDX #255
2790 .onoff
2800 LDA #10
2810 STA &FE00
2820 STX &FE01
2830 RTS
2840 :
2850 .dofiles
2860 STA file
2870 JSR putmap
2880 LDX #fwind MOD 256
2890 LDY #fwind DIV 256
2900 JSR prstr
2910 LDA #2
2920 STA counta
2930 .floop
2940 LDY counta
2950 LDA flo,Y
2960 STA from
2970 LDA fhi,Y
2980 STA from+1
2990 LDY #&11
3000 .movblk
3010 LDA (from),Y
3020 STA osblk,Y
3030 DEY
3040 BPL movblk
3050 LDY #&12
3060 LDA (from),Y
3070 STA text
3080 INY
3090 LDA (from),Y
3100 STA text+1
3110 LDY #0
3120 .movname
3130 LDA (text),Y
3140 STA name,Y
3150 INY
3160 CMP #32
3170 BNE movname
3180 CPY #1
3190 BEQ nofile
3200 LDA #13
3210 STA name-1,Y
3220 LDA file
3230 LDX #osblk MOD 256
3240 LDY #osblk DIV 256
3250 JSR osfile
3260 .nofile
3270 DEC counta
3280 BPL floop
3290 RTS
3300 :
3310 .error
3320 LDX #255
3330 TXS
3340 JSR osnewl
3350 LDY #0
3360 .printerr
3370 INY
3380 LDA (&FD),Y
3390 PHP
3400 JSR oswrch
3410 PLP
3420 BNE printerr
3430 JSR osrdch
3440 JSR reprint
3450 JMP mainloop
3460 :
3470 .flash
3480 LDA #7
3490 STA dracula
3500 .flloop
3510 LDA #19
3520 JSR osbyte
3530 JSR osbyte
3540 JSR osbyte
3550 LDY dracula
3560 LDX cyanseq,Y
3570 JSR vdu19
3580 LDX redseq,Y
3590 JSR vdu19
3600 DEC dracula
3610 BPL flloop
3620 RTS
3630 :
3640 .setsad
3650 LDX curspr
3660 LDA sprlo%,X
3670 STA to
3680 LDA sprhi%,X
3690 STA to+1
3700 RTS
3710 :
3720 .refh
3730 JSR setsad
3740 LDA #40
3750 STA counta
3760 LDA #95
3770 STA countb
3780 .rhloop
3790 LDX #8
3800 .rhloop2
3810 LDY counta
3820 LDA (to),Y
3830 PHA
3840 LDY countb
3850 LDA (to),Y
3860 LDY counta
3870 STA (to),Y
3880 PLA
3890 LDY countb
3900 STA (to),Y
3910 INC counta
3920 DEC countb
3930 DEX
3940 BNE rhloop2
3950 LDA counta
3960 SEC
3970 SBC #16
3980 STA counta
3990 BPL rhloop
4000 .rezoom
4010 JSR zoom
4020 JMP redraw
4030 :
4040 .refv
4050 JSR setsad
4060 LDX #0
4070 LDY #40
4080 JSR oneline
4090 LDX #48
4100 LDY #88
4110 JSR oneline
4120 JMP rezoom
4130 :
4140 .oneline
4150 STX counta
4160 STY countb
4170 LDA #3
4180 STA countc
4190 .rvloop
4200 LDX #8
4210 .rvloop2
4220 LDY counta
4230 LDA (to),Y
4240 JSR swap
4250 PHA
4260 LDY countb
4270 LDA (to),Y
4280 JSR swap
4290 LDY counta
4300 STA (to),Y
4310 LDY countb
4320 PLA
4330 STA (to),Y
4340 INC counta
4350 INC countb
4360 DEX
4370 BNE rvloop2
4380 LDA countb
4390 SEC
4400 SBC #16
4410 STA countb
4420 CMP counta
4430 BCS rvloop
4440 RTS
4450 :
4460 .swap
4470 PHA
4480 AND #&AA
4490 LSR A
4500 STA bits
4510 PLA
4520 AND #&55
4530 ASL A
4540 ORA bits
4550 RTS
4560 :
4570 .keys
4580 EQUB ASC"<":EQUW mleft
4590 EQUB ASC">":EQUW mright
4600 EQUB 136   :EQUW sleft
4610 EQUB 137   :EQUW sright
4620 EQUB 138   :EQUW sdown
4630 EQUB 139   :EQUW sup
4640 EQUB ASC"Z":EQUW cleft
4650 EQUB ASC"z":EQUW cleft
4660 EQUB ASC"X":EQUW cright
4670 EQUB ASC"x":EQUW cright
4680 EQUB ASC"/":EQUW cdown
4690 EQUB ASC"?":EQUW cdown
4700 EQUB ASC":":EQUW cup
4710 EQUB ASC"*":EQUW cup
4720 EQUB ASC",":EQUW deccol
4730 EQUB ASC".":EQUW inccol
4740 EQUB 13    :EQUW null
4750 EQUB 127   :EQUW null
4760 EQUB ASC"0":EQUW colnum
4770 EQUB ASC"1":EQUW colnum
4780 EQUB ASC"2":EQUW colnum
4790 EQUB ASC"3":EQUW colnum
4800 EQUB ASC"4":EQUW colnum
4810 EQUB ASC"5":EQUW colnum
4820 EQUB ASC"6":EQUW colnum
4830 EQUB ASC"7":EQUW colnum
4840 EQUB ASC"T":EQUW transp
4850 EQUB 140   :EQUW ednum
4860 EQUB 141   :EQUW ednum
4870 EQUB 142   :EQUW ednum
4880 EQUB ASC"-":EQUW setlev
4890 EQUB ASC"^":EQUW dellev
4900 EQUB 135   :EQUW source
4910 EQUB ASC"R":EQUW copy
4920 EQUB ASC"U":EQUW undo
4930 EQUB ASC"V":EQUW refv
4940 EQUB ASC"H":EQUW refh
4950 EQUB 6     :EQUW flash
4960 EQUB 3     :EQUW wipe
4970 EQUB 12    :EQUW load
4980 EQUB 19    :EQUW save
4990 EQUB 27    :EQUW esc
5000 EQUB 0
5010 :
5020 .bas
5030 EQUS "BASIC":EQUB 13
5040 :
5050 .ormask
5060 EQUD &2A2A2A3F
5070 EQUD &3F2A2A2A
5080 EQUD &0000003F
5090 EQUD &3F000000
5100 EQUD &1515153F
5110 EQUD &3F151515
5120 :
5130 .andmask
5140 EQUD &15151500
5150 EQUD &00151515
5160 EQUD &3F3F3F00
5170 EQUD &003F3F3F
5180 EQUD &2A2A2A00
5190 EQUD &002A2A2A
5200 :
5210 .xmax
5220 EQUB 12
5230 .ymax
5240 EQUB 8
5250 EQUB 12:EQUB 16
5260 EQUB 69:EQUB 121
5270 :
5280 .mul48
5290 EQUB 0:EQUB 48
5300 :
5310 .masks
5320 EQUB &55:EQUB &AA
5330 :
5340 .colbits
5350 EQUD &05040100
5360 EQUD &15141110
5370 :
5380 .coltab
5390 EQUD &0F0C0300
5400 EQUD &3F2A3330
5410 :
5420 .runedat
5430 EQUD &000080C0
5440 EQUD &C0800000
5450 EQUD &80C000C0
5460 EQUD &C00080C0
5470 EQUD &408000C0
5480 EQUD &C0004080
5490 EQUD &000040C0
5500 EQUD &C0400000
5510 :
5520 .sound
5530 EQUW 1:EQUW -10
5540 .pitch
5550 EQUW 0:EQUW 1
5560 :
5570 .flo
5580 EQUB rpfile MOD 256
5590 EQUB sdfile MOD 256
5600 EQUB bsfile MOD 256
5610 :
5620 .fhi
5630 EQUB rpfile DIV 256
5640 EQUB sdfile DIV 256
5650 EQUB bsfile DIV 256
5660 :
5670 .fwind
5680 EQUB 28:EQUB 1:EQUB 16:EQUB 18:EQUB 13
5690 EQUB 17:EQUB 128
5700 EQUB 17:EQUB 7
5710 EQUB 254
5720 :
5730 .bsfile
5740 EQUW fname:EQUD scenery%
5750 EQUD 0:EQUD scenery%
5760 EQUD scenery%+&BF4
5770 EQUW bsstr
5780 :
5790 .sdfile
5800 EQUW fname:EQUD compacted%
5810 EQUD 0:EQUD compacted%
5820 EQUD compacted%+&3C0
5830 EQUW sdstr
5840 :
5850 .rpfile
5860 EQUW fname:EQUD runes%
5870 EQUD 0:EQUD runes%
5880 EQUD runes%+&C0
5890 EQUW rpstr
5900 :
5910 .fname
5920 EQUS "$."
5930 .name
5940 EQUD 0:EQUD 0
5950 :
5960 .palette
5970 EQUD &F7E7D7C7
5980 EQUD &B7A79787
5990 EQUB &60
6000 :
6010 .cyanseq
6020 EQUD &60646760
6030 EQUD &67676067
6040 .redseq
6050 EQUD &17171711
6060 EQUD &11171717
6070 :
6080 .box
6090 EQUB 18:EQUB 3
6100 .boxcol
6110 EQUB 0
6120 EQUB 25:EQUB 9:EQUW 0:EQUW -68
6130 EQUB 25:EQUB 9:EQUW 104:EQUW 0
6140 EQUB 25:EQUB 9:EQUW 0:EQUW 68
6150 EQUB 25:EQUB 9:EQUW -104:EQUW 0
6160 EQUB 254
6170 :
6180 .tabblk
6190 EQUB 31:EQUW 0
6200 EQUB 17:EQUB 5
6210 EQUB 254
6220 :
6230 .messy
6240 EQUB 5:EQUB 8:EQUB 11
6250 :
6260 .strlo
6270 EQUB bsstr MOD 256
6280 EQUB sdstr MOD 256
6290 EQUB rpstr MOD 256
6300 .strhi
6310 EQUB bsstr DIV 256
6320 EQUB sdstr DIV 256
6330 EQUB rpstr DIV 256
6340 :
6350 .fmess
6360 EQUB 17:EQUB 128
6370 EQUB 28:EQUB 1:EQUB 16:EQUB 18:EQUB 1
6380 EQUB 12:EQUB 26
6390 EQUB 31:EQUB 5:EQUB 2
6400 EQUB 17:EQUB 5
6410 .v1
6420 EQUS " Load"
6430 .v2
6440 EQUS " Save"
6450 EQUB 6
6460 EQUS " Files"
6470 EQUB 17:EQUB 7
6480 EQUB 31:EQUB 1:EQUB 4
6490 EQUS "Background Sprites"
```

Continued ▶

◀ Designer Druids, listing 4 continued

```
6500 EQUB 31:EQUB 3:EQU
B 7
6510 EQUS "Screen Desig
ns"
6520 EQUB 31:EQUB 3:EQU
B 10
6530 EQUS "Rune Positio
ns"
6540 EQUB 17:EQUB 132
6550 EQUB 17:EQUB 3
6560 EQUB 31:EQUB 5:EQU
B 5
6570 EQUS " :"
6580 .bsstr
6590 EQUS "Scenery"
6600 EQUS " "
6610 EQUB 31:EQUB 5:EQU
B 8
6620 EQUS " :"
6630 .sdstr
6640 EQUS "ScrDat "
6650 EQUS " "
6660 EQUB 31:EQUB 5:EQU
B 11
6670 EQUS " :"
6680 .rpstr
6690 EQUS "RunePos"
6700 EQUS " "
6710 EQUB 17:EQUB 128
6720 EQUB 17:EQUB 1
6730 .v3
6740 EQUB 0
6750 EQUB 31:EQUB 6:EQU
B 13
6760 EQUS "WARNING!"
6770 EQUB 31:EQUB 1:EQU
B 14
6780 EQUS "Not all rune
s have"
6790 EQUB 31:EQUB 4:EQU
B 15
6800 EQUS "been defined
"
6810 EQUB 7:EQUB 6
6820 EQUB 17:EQUB 132
6830 EQUB 17:EQUB 3
6840 EQUB 254
6850 .normcols
6860 EQUB 17:EQUB 128
6870 EQUB 17:EQUB 7
6880 EQUB 254
6890 ]
6900 xtab%=FNdef(30)
6910 ytab%=FNdef(30)
6920 lo2%=FNdef(80)
6930 hi2%=FNdef(80)
6940 lo%=FNdef(32)
6950 hi%=FNdef(32)
6960 sprlo%=FNdef(30)
6970 sprhi%=FNdef(30)
6980 maplo%=FNdef(16)
6990 maphi%=FNdef(16)
7000 zlo%=FNdef(8)
7010 zhi%=FNdef(8)
7020 clo%=FNdef(8)
7030 chi%=FNdef(8)
7040 scrlo%=FNdef(96)
7050 scrhi%=FNdef(96)
7060 realend=P%
7070 edvdus%=FNdef(&161
)
7080 grass%=FNdef(&240)
7090 pass%=pass%+2
7100 FOR Z%=0 TO &7D:Z%
?&900=Z%?&482:NEXT
7110 ?&97E=?2:?&97F=?3
7120 IF pass%=2 CHAIN"E
d2"
7130 CHAIN"Ed5"
7140 :
7150 DEF FNdef(size)
7160 P%=P%+size
7170 =P%-size
```

Listing 5

```
10 REM >Ed5
20 REM by CSR - BAU 1
989
30 :
40 LOMEM=L%
50 FOR Z%=0 TO &7D:Z%
?&482=Z%?&900:NEXT
60 ?2=?&97E:?3=?&97F
70 PRINTCHR$13"Listin
g 5, pass 2"
80 FOR s%=0 TO 29
90 m6=s% MOD 6
100 IF m6<3 xtab%?s%=2
+8*m6 ELSE xtab%?s%=56+8
*(m6-3)
110 ytab%?s%=152+20*(s
% DIV 6)
120 NEXT
130 FOR s%=0 TO 79
140 s%?lo2%=(8*s%) MOD
256
150 s%?hi2%=(8*s%) DIV
256
160 NEXT
170 FOR s%=0 TO 31
180 a%=&3000+640*s%
190 s%?lo%=a% MOD 256
200 s%?hi%=a% DIV 256
210 NEXT
220 FOR s%=0 TO 29
230 a%=scenery%+96*s%
240 s%?sprlo%=a% MOD 2
56
250 s%?sprhi%=a% DIV 2
56
260 NEXT
270 FOR s%=0 TO 15
280 a%=compacted%+s%*6
0
290 s%?maplo%=a% MOD 2
56
300 s%?maphi%=a% DIV 2
56
310 NEXT
320 FOR s%=0 TO 7
330 a%=zpos%+640*s%
340 s%?zlo%=a% MOD 256
350 s%?zhi%=a% DIV 256
360 a%=cpos%+24*s%
370 s%?clo%=a% MOD 256
380 s%?chi%=a% DIV 256
390 NEXT
400 FOR s%=0 TO 95
410 a%=&3000+((s% DIV
12)*2+1)*640+((s% MOD 12
)*3+2)*16
420 s%?scrlo%=a% MOD 2
56
430 s%?scrhi%=a% DIV 2
56
440 NEXT
450 PROCosprey("LOAD E
dVDUs "+STR$~edvdus%)
460 PROCosprey("LOAD G
rass "+STR$~grass%)
470 error%=FALSE
480 PRINT'"Checking co
de..."'
490 FOR list%=2 TO 4
500 READ nc%,st$
510 FOR c%=1 TO nc%
520 READ end$,sum%
530 PRINTCHR$13"Listin
g ";list%;" ."st$;" to .
"end$;
540 t%=0
550 FOR i%=EVAL(st$) T
O EVAL(end$)
560 t%=t%+?i%
570 NEXT
580 IF t%<>sum% PRINTC
HR$129CHR$136"Error":err
or%=TRUE
590 PRINTCHR$13SPC38;
600 st$=end$
610 NEXT
620 NEXT
630 save$="SAVE Dredit
 "+STR$~final%+" "+STR$~
(P%+&161)+" "+STR$~dredi
t+" "+STR$~final%
640 IF error% PRINT'"P
lease check errors repor
ted.":END
650 PRINT''"*"save$
660 OSCLI(save$)
670 END
680 :
690 DEF PROCosprey(o$)
700 $&900=o$
710 X%=0:Y%=9
720 CALL &FFF7
730 ENDPROC
740 :
750 DATA 6,dredit
760 DATA gotakey,19498
770 DATA transp,20951
780 DATA dozpos,12728
790 DATA sright,16871
800 DATA drawbox,17292
810 DATA runedel,10434
820 :
830 DATA 7,runedel
840 DATA sprret,14728
850 DATA zoom,15672
860 DATA jsrdo4,14022
870 DATA show,16737
880 DATA showrunes,167
98
890 DATA putmap,68957
900 DATA copy,7997
910 :
920 DATA 7,copy
930 DATA undo,18532
940 DATA getnames,1421
8
950 DATA dofiles,21269
960 DATA refv,23594
970 DATA bas,16988
980 DATA box,12248
990 DATA normcols,1550
6
```

Listing 6

```
10 REM >EdDat
20 REM Creates Editor
 Data
30 REM by Chris Rusem
an
40 REM for BBC B/B+/M
/C
50 REM (c) BAU August
 1989
60 :
70 MODE 2
80 DIM d% &2C0,o% &80
90 *Spool EdVDUs
100 VDU 23,128,0,0,&F0
,&F0,&F0,&F0,&F0,&F0
110 VDU 23,129,0,0,&A0
,&50,&A0,&50,&A0,&50
120 VDU 23,130,&38,&44
,&41,&38,&05,&44,&38,&00
130 VDU 23,131,&78,&44
,&45,&78,&49,&44,&44,&00
140 GCOL 0,1
150 PROCbox(1,30,11,19
)
160 PROCbox(28,30,38,1
9)
170 GCOL 0,2
180 PROCbox(2,17,37,1)
190 GCOL 0,3
200 PROCbox(14,28,25,2
8)
210 PROCbox(14,30,17,3
0)
220 PROCbox(20,30,25,3
0)
230 GCOL 0,4
240 PROCbox(14,26,25,1
9)
250 VDU 31,7,30,130
260 VDU 31,10,30,131
270 VDU 5
280 FOR i%=0 TO 7
290 PROCcol(i%,14*32+i
%*48+8,128)
300 NEXT
310 VDU 4,254
320 *Spool
330 PROCosprey("LOAD S
crn2 "+STR$~d%)
340 PROCosprey("SAVE G
rass "+STR$~(d%+&40)+" +
240")
350 VDU 30
360 END
370 :
380 DEF PROCbox(x1,y1,
x2,y2)
390 MOVE x1*32-16,1024
-(y1*32)-8-32
400 DRAW x2*32+40,1024
-(y1*32)-8-32
410 DRAW x2*32+40,1023
-(y2*32)+8
420 DRAW x1*32-16,1023
-(y2*32)+8
430 DRAW x1*32-16,1024
-(y1*32)-8-32
440 ENDPROC
450 :
460 DEF PROCcol(col,x,
y)
470 IF col=6 GCOL 0,7:
c=129 ELSE GCOL 0,col:c=
128
480 MOVE x,y
490 VDU c
500 ENDPROC
510 :
520 DEF PROCosprey(o$)
530 $o%=o$
540 X%=o% MOD 256
550 Y%=o% DIV 256
560 CALL &FFF7
570 ENDPROC
```

See Spycatcher, page 71

Listing 1. Program encoder source code

```
10 REM ENCODE source
20 REM by Zak Kipplin
g
30 REM for B/B+/M/C/E
40 REM (c) BAU August
 1989
50 :
60 code=&50
70 fname=&90:REM &80
 if Econet fitted
80 buffer=&A00
90 osargs=&FFDA
100 gsinit=&FFC2
110 gsread=&FFC5
120 osfind=&FFCE
130 osgbpb=&FFD1
140 FOR I%=0 TO 2 STEP
 2
150 P%=&900
160 [OPT I%
170 .start
180 LDA #&01
190 LDX #&70
200 LDY #&00
210 JSR osargs
220 LDA &70
230 STA &F2
240 LDA &71
250 STA &F3
260 LDY #&00
```

Continued ▶

◀ Spycatcher, listing 1 continued

```
 270 CLC
 280 JSR gsinit
 290 BNE getname
 300 RTS
 310 .getname
 320 TYA
 330 CLC
 340 ADC &F2
 350 STA &70
 360 LDA &F3
 370 ADC #&00
 380 STA &71
 390 LDX #&00
 400 .loop
 410 JSR gsread
 420 STA fname,X
 430 INX
 440 BCC loop
 450 LDA #&0D
 460 STA fname-1,X
 470 SEC
 480 JSR gsinit
 490 BNE getcode
 500 RTS
 510 .getcode
 520 LDX #&00
 530 .loop2
 540 JSR gsread
 550 STA code,X
 560 INX
 570 BCC loop2
 580 LDA #&00
 590 STA code-1,X
 600 LDA #&C0
 610 LDX #fname AND &FF
 620 LDY #fname DIV &10
0
 630 JSR osfind
 640 CMP #&00
 650 BNE scramble
 660 BRK
 670 EQUB &DF
 680 EQUS "Can't"
 690 EQUB &00
 700 .scramble
 710 LDX #&00
 720 STX &70
 730 STX &71
 740 STA block
 750 CLC
 760 .tloop
 770 JSR setblock
 780 LDA #&03
 790 JSR osgbpb
 800 PHP
 810 JSR change
 820 PLP
 830 PHP
 840 JSR setblock
 850 LDA #&01
 860 JSR osgbpb
 870 INC &70
 880 PLP
 890 BCC tloop
 900 LDA #&00
 910 LDY block
 920 JMP osfind
 930 .setblock
 940 LDA #&00
 950 STA block+1
 960 STA block+7
 970 STA block+8
 980 STA block+9
 990 STA block+11
1000 STA block+12
1010 LDX #&0A
1020 STX block+2
1030 BCS less
1040 LDX #&01
1050 STX block+6
1060 STA block+5
1070 .rest
1080 LDA &70
1090 STA block+10
1100 LDA #&FF
1110 STA block+3
1120 STA block+4
1130 LDX #block AND &FF
1140 LDY #block DIV &10
0
1150 RTS
1160 .less
1170 LDA #&00
1180 SBC block+5
1190 STA block+5
1200 LDA #&01
1210 SBC block+6
1220 STA block+6
1230 JMP rest
1240 .change
1250 LDY #&00
1260 LDX &71
1270 .cloop
1280 LDA buffer,Y
1290 EOR code,X
1300 STA buffer,Y
1310 INX
1320 LDA code,X
1330 CMP #&20
1340 BCS cok
1350 LDX #&00
1360 .cok
1370 INY
1380 BNE cloop
1390 RTS
1400 .block
1410 ]
1420 NEXT
1430 PRINT "Saving..."'
1440 PRINT ">*SAVE ENCO
DE FFFF0900+"+STR$~(P%-&
900)
1450 OSCLI "*SAVE ENCOD
E FFFF0900+"+STR$~(P%-&9
00)
1460 PRINT '"To use:"
1470 PRINT " *ENCODE <f
sp> <code>"
```

Listing 2. Basic run

(Make sure line 10 is typed in exactly as shown)

```
  10 REM123456789012345
678901234567890123456789
0123 BASRUN by Zak Kipli
ng
  20 REM for B/B+/M/C/E
  30 REM (c) BAU August
 1989
  40 :
  50 p%=?&70
  60 IF ?(p%*256+4)<>&F
4 THEN PRINT "First line
 must be: REM12345678901
234567890123456789012345
67890123 ...":PAGE=p%*25
6:END
  70 FOR I%=p%*256+5 TO
 p%*256+47
  80 IF ?I%=&0D THEN I%
=(p%+1)*256
  90 NEXT
 100 IF I%>=(p%+1)*256
THEN PRINT "First line m
ust be: REM1234567890123
456789012345678901234567
890123 ...":PAGE=p%*256:
END
 110 FOR I%=0 TO 2 STEP
 2
 120 P%=p%*256+5
 130 [OPT I%
 140 EQUB &15
 150 LDA &18
 160 STA &70
 170 LDA #p%
 180 STA &18
 190 LDA #&15
 200 JSR &FFEE
 210 LDA #&8A
 220 LDX #&05
 230 STX &71
 240 .loop
 250 LDX &71
 260 LDY text,X
 270 INY
 280 LDX #&00
 290 JSR &FFF4
 300 DEC &71
 310 BPL loop
 320 RTS
 330 .text
 340 EQUD &0CF8050C
 350 EQUW &4E2D
 360 EQUB &06
 370 ]
 380 NEXT
 390 PAGE=p%*256
 400 INPUT "Filename",F
$
 410 OSCLI "SAVE "+F$+"
 "+STR$~PAGE+"+"+STR$~(T
OP-PAGE)+" "+STR$~(PAGE+
6)
 420 END
```

See Off the Wall, page 79

Listing 1. Wallpaper

```
  10 REM >Wallpapr1
  20 REM by C Attenborough
  30 REM for Arc only
  40 REM (c) BAU August 1989
  50 :
  60 MODE 13
  70 S=1
  80 red%=&17
  90 blue%=&8B
 100 green%=&63
 110 DIM space% 2000
 120 DIM colours%(5)
 130 DIM xsqlo 1024,xsqhi 1024
 140 DIM ysqlo 1024,ysqhi 1024
 150 colours%(0)=65536*green%+256*blue%
+red%
 160 colours%(1)=65536*red%+256*green%+
blue%
 170 colours%(2)=65536*blue%+256*red%+g
reen%
 180 colours%(3)=65536*blue%+256*green%
+red%
 190 colours%(4)=65536*red%+256*blue%+g
reen%
 200 colours%(5)=65536*green%+256*red%+
blue%
 210 ox=0:oy=0:oside=0
 220 PROCfindstart:PROCassy
 230 CLS
 240 VDU 28,32,31,39,0
 250 GCOL 0,1 TINT 0
 260 :
 270 REPEAT
 280 PROCenter
 290 CALL fillarrays
 300 FOR J%=0 TO 5
 310 !c1=colours%(J%)
 320 CALL drawscreen
 330 PRINTTAB(1,14);"Palette"
 340 PRINTTAB(1,16);J%+1;" of 6"
 350 PRINTTAB(0,18);'"  Hit a"'"    key"
 360 IF GET=ASC"S" THEN PROCsave(S):S+=
1
 370 NEXT
 380 UNTIL 0
 390 END
 400 :
 410 DEF PROCfindstart
 420 DIM block% 12:block%!0=149:block%!
4=-1
 430 SYS "OS_ReadVduVariables",block%,b
lock%+8
 440 ENDPROC
 450 :
 460 DEF PROCassy
 470 xbaselo=0:xbasehi=1
 480 ybaselo=2:ybasehi=3
 490 x=4:y=5
 500 in=6:index=7
 510 side=8:t1=9
 520 dest=10
 530 :
 540 across=4:up=5
 550 x2lo=6:x2hi=7
 560 y2lo=8:y2hi=9
 570 sumlo=10:sumhi=11
 580 colour=11:mod4=11
 590 screen=12
 600 :
 610 sp=13:link=14:pc=15
 620 :
 630 FOR pass=0 TO 2 STEP 2
 640 P%=space%
 650 [
 660 OPT pass
 670 .fillarrays
 680 STMFD (sp)!,{link}
 690 LDR y,ystore
 700 LDR x,xstore
 710 LDR side,sidestore
 720 LDR xbaselo,x2l
 730 LDR xbasehi,x2h
 740 LDR ybaselo,y2l
 750 LDR ybasehi,y2h
 760 MOV index,#0
 770 .nxtsq
 780 MOV in,x
 790 BL square
 800 STR dest,[xbaselo,index]:STR (dest
+1),[xbasehi,index]
 810 MOV in,y
 820 BL square
 830 STR dest,[ybaselo,index]:STR (dest
+1),[ybasehi,index]
 840 ADD x,x,side
 850 ADD y,y,side
 860 ADDS index,index,#4
 870 CMP index,#1024
 880 BNE nxtsq
 890 LDMFD (sp)!,{pc}
 900 :
 910 .drawscreen
 920 STMFD (sp)!,{link}
 930 LDR xbaselo,x2l
 940 LDR xbasehi,x2h
 950 LDR ybaselo,y2l
 960 LDR ybasehi,y2h
 970 MOV up,#1020
 980 LDR screen,screenstart
 990 .nextup
1000 LDR y2lo,[ybaselo,up]:LDR y2hi,[yb
asehi,up]
1010 MOV across,#0
1020 .nextacross
1030 LDR x2lo,[xbaselo,across]:LDR x2hi
,[xbasehi,across]
1040 ADDS sumlo,x2lo,y2lo:ADC sumhi,x2h
i,y2hi
1050 AND sumhi,sumhi,#&C
1060 MOVS mod4,sumhi,LSR#2
1070 BEQ screenwrite\ implicit black
1080 CMP mod4,#1
1090 BNE l1
1100 LDRB colour,c1
1110 B screenwrite
1120 .l1
1130 CMP mod4,#2
1140 BNE l2
1150 LDRB colour,(c1+1)
1160 B screenwrite
1170 .l2
1180 LDRB colour,(c1+2)
1190 .screenwrite
1200 STRB colour,[screen],#1
1210 ADDS across,across,#4:CMP across,#
1024:BNE nextacross
1220 ADD screen,screen,#(320-256)
1230 SUBS up,up,#4:BGE nextup
1240 LDMFD (sp)!,{pc}
1250 :
1260 .square
1270 STMFD (sp)!,{link}
1280 TST in,#&10000000
1290 MVNNE in,in:ADDNE in,in,#1
1300 MOV t1,in,LSR #16
1310 BIC in,in,t1,LSL #16
```

Continued ▶

WORDPROCESSING

◀ Off the Wall, listing 1 continued

```
1320 MUL dest,in,in
1330 MUL (dest+1),t1,t1
1340 MUL t1,in,t1
1350 ADDS dest,dest,t1,LSL #16
1360 ADC (dest+1),(dest+1),t1,LSR #16
1370 ADDS dest,dest,t1,LSL #16
1380 ADC (dest+1),(dest+1),t1,LSR #16
1390 LDMFD (sp)!,{pc}
1400 :
1410 .screenstart EQUD block%!8
1420 .ystore EQUD 0
1430 .xstore EQUD 0
1440 .sidestore EQUD 0
1450 .c1 EQUD 0
1460 .x2l EQUD xsqlo
1470 .x2h EQUD xsqhi
1480 .y2l EQUD ysqlo
1490 .y2h EQUD ysqhi
1500 ]
1510 NEXT
1520 ENDPROC
1530 :
1540 DEF PROCenter
1550 ON:REPEAT
1560 CLS
1570 PRINTTAB(3,2)"X"'"<";ox;">":INPUTx
$
1580 IF x$="" x=ox ELSE x=VAL(x$)
1590 PRINTTAB(3,6)"Y"'"<";oy;">":INPUTy
$
1600 IF y$="" y=oy ELSE y=VAL(y$)
1610 PRINTTAB(3,10)"Side"'"<";oside;">"
:INPUTside$
1620 IF side$="" side=oside ELSE side=V
AL(side$)
1630 accept%=TRUE
1640 IF ABS(x)>=2048 accept%=FALSE
1650 IF ABS(y)>=2048 accept%=FALSE
1660 IF ABS(side)>=2048 accept%=FALSE
1670 IF ABS(side)+ABS(x)>=2048 accept%=
FALSE
1680 IF ABS(side)+ABS(y)>=2048 accept%=
FALSE
1690 IF accept%=FALSE VDU7:PRINT'"Numbe
rs too big"''" Hit a"'"  key":IF GET
1700 UNTILaccept%=TRUE
1710 ox=x:oy=y:oside=side
1720 !xstore=x*(1<<17):REM max no to be
 squared is 2047.99......
1730 !ystore=y*(1<<17):!sidestore=side*
(1<<9)
1740 OFF:ENDPROC
1750 :
1760 DEF PROCsave(S)
1770 OSCLI("SCREENSAVE Screen"+STR$(S))
1780 ENDPROC
```

See Good Wording, page 81

Listing 1. !Boot file

```
*BASIC
Q%=0
IF PAGE=&0E00 Z%=77 EL
SE Z%=66
*WORDWISE
:SELECT SEGMENT 0
:LOAD TEXT "!MENU"
*FX138,0,144
*FX138,0,144
```

Listing 1 should be typed in using *build !boot

```
REM Wordwise Plus Men
u
REM by N.D.Munns
REM for B/B+/M/C/A wi
th WW+
REM (c) BAU August 19
89

IF Q%=0 THEN PROCmake
file

CLS
SELECT SEGMENT 2

CURSOR TOP
T$=GLT$
CURSOR TOP
IF T$="" OR GCT$=" "T
HEN T$="NO DISC TITLE"
S$=""
S%=0
REPEAT
S%=S%+1
S$=S$+" "
UNTIL S%=(16-LENT$)/2

I%=0
REPEAT
I%=I%+1
VDU 132,157,131,141
PRINT S$+"WORDWISE FI
LES : "+T$
UNTIL I%=2
VDU 10

CURSOR TOP
CURSOR DOWN
A%=0
B%=64
REPEAT
A%=A%+1
B%=B%+1
PRINT "    ";
CURSOR AT 0
A$=GLT$
IF LEN A$>0 THEN PROC
menu
IF A%=1 THEN PRINT "
    ";
IF A%=2 THEN VDU 10,1
3
IF A%=2 THEN A%=0
CURSOR AT 0
UNTIL A$=""

VDU 10,10,13,131
PRINT "Press SHIFT/f1
 to update list of files
."
VDU 13,135
PRINT " Which file to
load ? ( Press letter )
"
VDU 13,10
*FX 15,0
PRINT "
";
REPEAT
*FX 202,32
A$=GCK$
UNTIL ASC(A$)<=B%-1 A
ND ASC(A$)>64
C%=ASC(A$)-63
CURSOR TOP
CURSOR DOWN C%-1
F$=""
F$=GLT$
VDU 134
PRINT F$;

SELECT TEXT
LOAD TEXT F$
END

.menu
VDU 131,B%,134,32
PRINT A$;
ENDPROC

.makefile

SELECT SEGMENT 1
DELETE TEXT
TYPE "Q%=0"
TYPE CHR$13
```

Continued ▶

◀ **Good Wording, listing 2 continued**

```
    TYPE "*FX 138,0,144"
    Q%=99

    *INFO !BOOT
    CLS

    I%=0
    REPEAT
    I%=I%+1
    VDU 132,157,131,141
    PRINT "                WORDW
ISE FILES"
    UNTIL I%=2
    VDU 10,10,131


    PRINT "   Creating ne
w disc contents file."
    VDU 10
    PRINT "              PLEA
SE WAIT ........"
    VDU 10,10
    IF Z%=66 THEN A%=&0E0
0
    IF Z%=77 THEN A%=&C00
0

    SELECT SEGMENT 2
    DELETE TEXT

    B%=0
    H$=""
    REPEAT
    H$=H$+CHR$?(A%+B%)
    B%=B%+1
    UNTIL B%=8
    TYPE H$
    TYPE CHR$13
    A%=A%+8

    I%=1
    REPEAT
    B%=0
    H$=""
    I%=I%+1
    REPEAT
    H$=H$+CHR$?(A%+B%)
    B%=B%+1
    UNTIL B%=7
    J%=?(A%+B%)
    IF J%>&80 THEN J%=J%-
&80
    H$=CHR$(J%)+"."+H$
    IF H$<>"$.!BOOT  "AND
 H$<>"$.!MENU  "AND LEN
H$=9 THEN PROCtype
    A%=A%+8
    UNTIL (I%>1 AND J%=0)
 OR I%>31 OR LEN H$<9
    TYPE CHR$13
    VDU 7
    ENDPROC

    .type
    TYPE H$
    TYPE CHR$13
    ENDPROC
```

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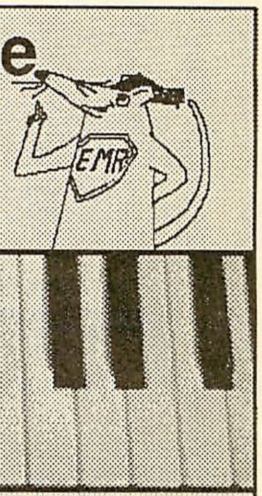
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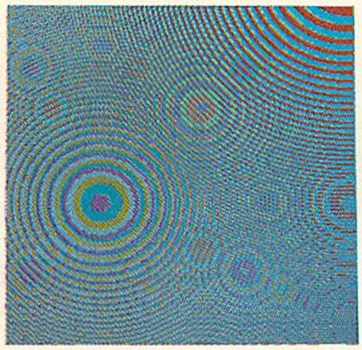
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THIS MONTH'S LISTINGS

On this month's fun packed disc you'll find the second part of Chris Ruseman's *Rune-Maker* game. With this powerful editor you can design your own graphics and screens. If you missed the original, then why not check out the April issue and disc?

Hints & Tips covers such diverse subjects as extending the Auto command, printer hex dumps and the perennial problem of multiple columns in *View.*

Agora features a module that allows 8-bit BBC screen files to be loaded and displayed on the Archimedes, and for the mathematicians among you, there is an Arm code routine to find prime numbers.



Along a similar line to the HodgePodge machine in the March issue, is a 'Wallpaper' generator – another psychedelic pattern producer for the Archimedes!

To finish off, the disc also includes the data encoding algorithms and *Wordwise Plus* menu system featured in this issue.

Sky watching

GAMES DISC

Ten of the best *Acorn User* games on one 80-track double-sided 5.25-inch disc.

Whether you're into arcade or adventure type games this new disc has something for everyone. The games included are *Warlord, Wizalon, Castle of Nightmares, Run Silent, Run Deep, Polyominoes* and *Quadline.* We have also included three of the most popular one-line games from recent Abusers. Test your knowledge with *Mastermind* and start playing *Varpon* and *Lurch* to win.

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'88 COMPILATION DISC

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BBC, Master and Compact owners

Included on the 5.25in and 3.5in Master Compact version are the following programs: *Wizalon,* the bouncing wizards game; AutoROM; our *Micro Sherlock* intelligence test; Joe's introduction to spreadsheets; Bezier Curves; Microspacing and justifying for *View; Polyominoes,* and *Imagen,* the adventure creator, plus the best in graphics from 1988.

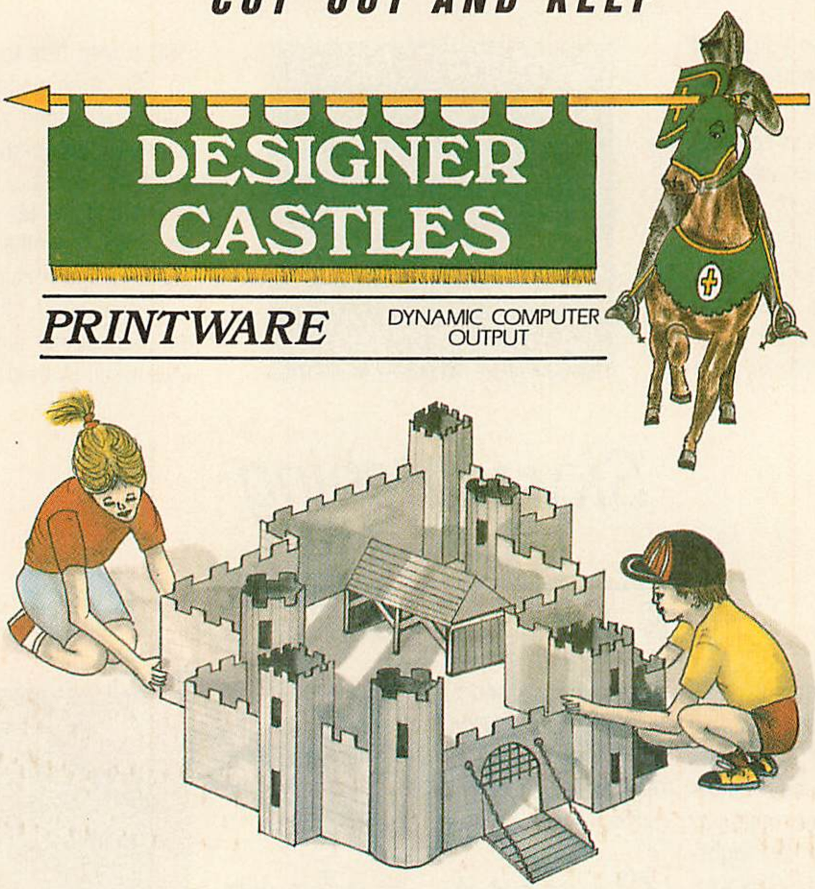
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You can make your designs as simple or as complicated as you please. Extra buildings and working models of siege weapons are included for added realism and entertainment.

When you are sure you're satisfied with your design, simply switch on your Epson-compatible printer then sit back and watch while it produces your plan – and every component necessary to construct your model. Now all that's left to do is to cut out the pieces then fold and glue everything together. The software even puts glue tabs in all the right places and provides strengtheners to ensure a sturdy and usable model. When you tire of your castle simply screw it up and design another – as many as you like.

The *Designer Castles* package contains a Printware support ROM, the *Designer Castles* system disc (two discs for 40-track users), comprehensive User Guide/Manual and a hardbacked full colour binder.

Designer Castles is supplied for the BBC B/B+, Master 128 and Master Compact. It requires an Epson compatible printer of quad density graphics. We feel that *Designer Castles* is the perfect addition to all our reader's software libraries. 'It is providing a design and discovery environment, the like of which has not been seen on a BBC micro…', *BBC Acorn User,* March 89.

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Archimedes Games

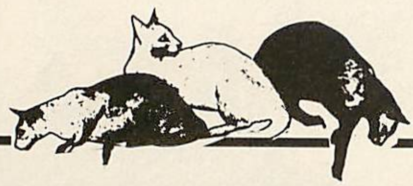
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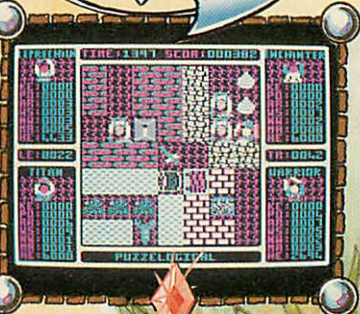
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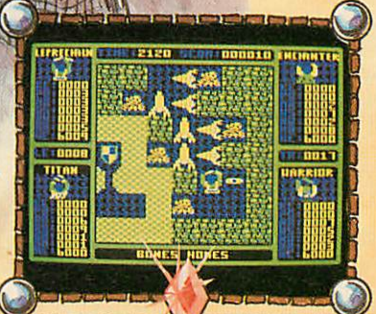


Moriana The Warrior

Moriana is a fearless warrior. What she lacks in brute strength is easily compensated by her body armour and sculptured shield. This is complimented by a razor-edged sword and makes her highly effective in hand-to-hand combat. And she alone can hack down the rank vines that can hinder progress.







Kaldor The Leprechaun

This skilled archer has little in the way of strength or armour but has 2 unique magical gifts. Firstly his ability to run like the wind can prove very useful to avoid boards of enemies and to save precious time. Secondly he alone can leap over otherwise insurmountable mighty tree trunks.

White Magic – Where Good embodies Bad and Fantasy becomes Reality

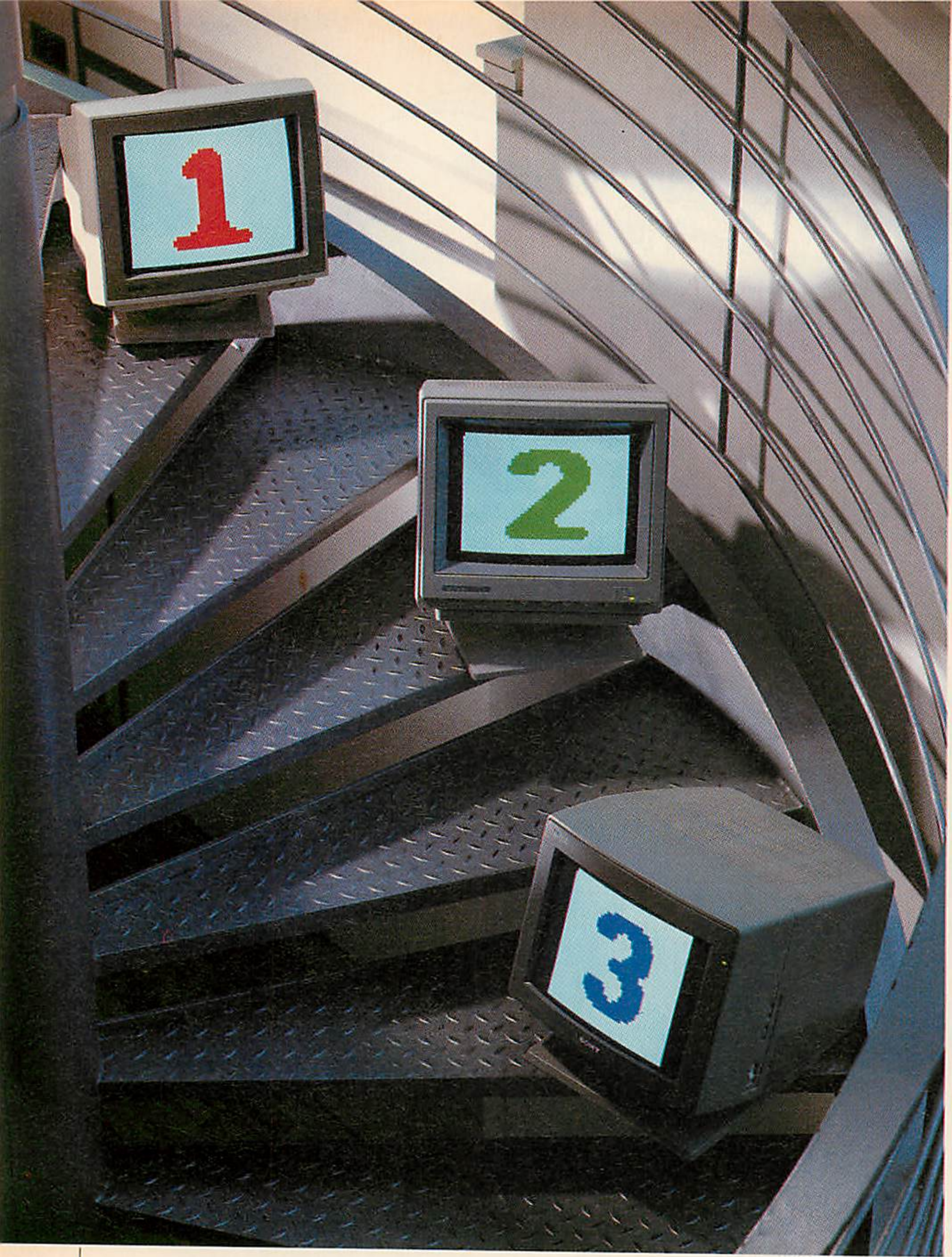
White Magic is a unique arcade adventure in which you can actually transform between all 4 characters at any time during play. It features 32 massive action-packed levels filled with aggressive evil guards and trolls, haunting ghosts and spectres, curious objects to find and use, transporters and much, much more.

To complete the game you must survive all 32 levels, each with its own theme. Certain characters will fair better than others on different levels and it is your job to know when to transform between characters if you are to succeed.

White Magic is not a game for the faint-hearted; it is a fast-action game which requires fierce hand-to-hand combat and frantic weapon fire. Each character has his or her own levels of energy, weapon strength, magical power and armour. And by carefully collecting the artefacts as you progress through the levels you can develop each of the characters to their maximum potential.

Artefacts can be useful or harmful and include such things as potions, spellbooks, amulets, time-bombs, swords, time-pills, scrolls, shields, ammo-boxes, staffs and rings. White Magic puts you amongst heroes in a world of magic, danger and adventure. Is it all just a dream?


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A 200-year-old exponent of the Art of White Magic who can cast potions of great strength weakening all adversaries opposing him. He can also hurl deadly fireballs with great accuracy but has little armour and is severely weakened if he attempts hand-to-hand combat. He alone can cross the magic pentagrams blocking vital passageways.
Cheysul The Titan
This huge being has incredible strength and a massive axe allowing him to quickly annihilate all foes in his path. His great strength enables him alone to push gigantic casks out of his way. But he only has limited magical powers making his use of potions quite ineffective.
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PHOTOGRAPH BY JOHN BARLOW

A STEP AHEAD

Graham Bell outlines the advantages of the multisync monitor for the Arc owner – and tests out three of the best

Acorn's Archimedes can be teamed with a variety of different monitors. An A310 or A3000 can be linked to a monochrome screen, an analogue colour screen to give the full range of hues or a 'VGA-type' monitor intended for IBM PCs.

In addition, 400-series machines can be attached to ultra-high resolution 19in mono monitors. However, for any Arc, the most flexible step up from a normal colour monitor is a multiple-frequency or 'multisync' monitor.

Each type of monitor can display a range of screen modes – 0-17 plus 24 for normal monitors, modes 25-28 only for VGA monitors and the unique mode 23 for high-resolution mono. Multisyncs can display all of these except mode 23, and they have their own modes 18-21.

You have to configure the monitor type: *CONFIGURE MonitorType followed by 0 for normal, 1 for multisync, 2 for hi-resolution mono or 3 for VGA-type monitors. Once configured, your Arc won't let you select a mode the monitor can't display. This is vital, as you can damage a monitor irreparably by feeding it a signal it can't deal with.

Normal monitors display the 256 horizontal lines of the picture in each 50th of a second. This gives only adequate screen resolution but it is the standard of display everyone is used to. A multisync monitor is capable of, not only displaying this sort of picture, but also 512 lines per frame – which is twice the frequency.

In fact, the monitor can switch between the two picture types automatically so you don't have to stick to one type of screen mode at all times, you can choose any one (except 23).

The picture displayed in a normal mode is the same as you get with a normal monitor. Although all the multi-frequency monitors tested had sharp and detailed displays, they were no different from the best normal colour monitors.

In a 512-line (multisync only) mode, the picture looks quite different, with twice the vertical resolution.

Instead of the usual horizontal 'striped' appearance, areas of colour appear to be quite solid. The picture looks right because the pixels are square. In mode 12 (640 by 256 pixels) each pixel is twice as deep as it is wide.

In mode 20, horizontal black lines like the edges of windows are thin and well-detailed and the anti-aliassed fonts are ideally displayed.

Nevertheless there are some oddities that you'll immediately notice if you use a multisync monitor. The overscan area (the grey edge around the desktop screen) is missing. Some people find the grey attractive. Second, the cursor changes shape. This is particularly noticeable with the hourglass which looks stumpy compared with its normal mode 12 appearance.

Some text appears only half the height it should be (though it's never unreadable). This doesn't apply to normal text, only if you use the star command option on the desktop (f12 or from the task manager menu) or start up a Basic window with the task manager.

Switching between multisync modes and normal modes takes just a fraction of a second. Most of the monitors switch their internal circuitry using relays and there is a noticeable click as the monitor locks on to the new signal.

The picture appears to shift across the screen and change size – the mode 12 screen area is well to the left of the multisync mode area. This is distracting, and with a couple of the monitors you can't adjust things so both pictures are visible. If you put all of the multisync picture on the screen, part of the normal mode picture is off the left edge.

Finally, the display can go blank or flash for a few seconds when you access a

disc. This is most disconcerting the first time it happens.

For the technical, this happens only in mode 21. The VIDC chip needs most of the available memory bandwidth (640 by 512 pixels in 256 colours means a huge amount of data needs to be read for each frame) and the disc system needs more than is left over.

Something has to give, and sensibly, the disc system takes precedence. The screen display goes blank temporarily as you load or save. Because of this, mode 21 is practically unusuable.

You'll also notice the whole machine works slower in mode 20 or 21 than in their equivalent non-multisync modes 12 and 15. This is an inevitable consequence of the Arc's design.

The higher the resolution or the more colours in the display, the more memory bandwidth is needed by VIDC, and the less is left over for the Arm chip to use for processing. A job like recalculating a spreadsheet takes a fifth to a quarter longer in memory-hungry mode 20 than in mode 12.

All of the monitors have a confusing range of switches on the rear. None of the manuals show the switch settings for the Arc of course, though with a bit of thought there's enough information in each of them to get it right first or second time. There's no universal way of setting them, but aim for analogue input, not TTL. The cables that are supplied with the monitors are usually all you need to plug them in.

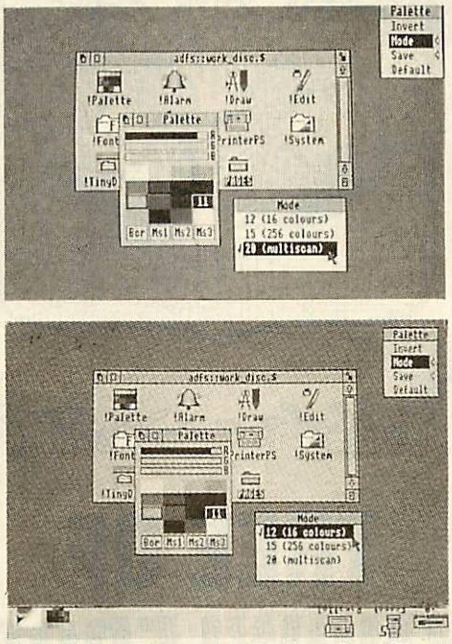
All the monitors can be used with the Master 128 or model B (with a special cable) but it would be a senseless waste of money – the picture they display would be exactly the same as a normal colour monitor costing half as much. You can't make any use of the monitor's potential to display higher resolution.

1 Taxan 770

This is a big, bulky-looking and back straining monitor which is priced at around £460. Connecting it up is fairly simple. The standard cable plugs straight into the back of the Arc.

On first trying it out, the picture proved much too dull, even with brightness and contrast controls full up. This was partly a problem with the particular review unit but the other monitors in this test were affected as well, though to a lesser extent. The problem is that the original Arc's RGB output voltage is a tad on the low side. A tryout with an A3000 showed a much brighter picture, and I expect the 400/1 machines to show this improvement too.

There are controls to affect the overall brightness and the colour balance of the screen but these can't be altered without removing the monitor casing. You shouldn't try this unless you know what you're doing and make sure you unplug the monitor at the mains an hour or two before you work on it and short across the mains plug pins (use an insulated screw driver) – colour monitors store a hefty charge a long time after switch-off.



Comparison of normal (top) and multisync monitors. Note the difference in clarity

Once adjusted, this monitor proves its real mettle. On the back is an array of separate controls for adjusting the picture in each mode so the normal, multisync and VGA mode pictures can all be set so their sizes and positions match.

Front controls for brightness and contrast give enough adjustment to cope with dark or bright room conditions and the picture was commendably crisp and rock steady.

2 Eizo 8060

The smaller Eizo monitor, priced at around £440, proves an easy match for the Taxan's picture quality. Setting it up was even simpler and the picture was pretty good first time – steady, sharp and reasonably bright.

The real difference between this and the Taxan is that it lacks the individual controls for each screen mode. On the Eizo, all modes share the same picture size and position control. Although the thumbwheels are convenient on the front of the monitor, it isn't nearly as easy as setting up each mode once and for all. You have to change the setting each time you change mode. This isn't as tiresome as it seems though. Under Risc OS, it's likely that many programs (certainly those that work from the desktop) will work in all or most modes, as do the applications on the welcome discs. So once you choose a mode, you'll find that you tend to stick to it.

3 Sony CPD-1402E

This monitor certainly looks the biggest of the three reviewed, and it is the most weighty. And at around £550, it is also the most expensive. It also proved by far the most difficult to set up. The leads provided were incorrect, and a special monitor lead had to be soldered up.

Once correctly connected, the monitor is similar in picture sharpness to the Eizo. However, it isn't as rock steady and the colours on screen are not nearly as rich, in fact they look distinctly pasty.

Despite the vaunted black background to the screen, there seemed less contrast than with the other two monitors. This was partly the fault of the Arc 310 I was using. Again, an A3000 gave a noticeably better, brighter screen with a more acceptable degree of contrast.

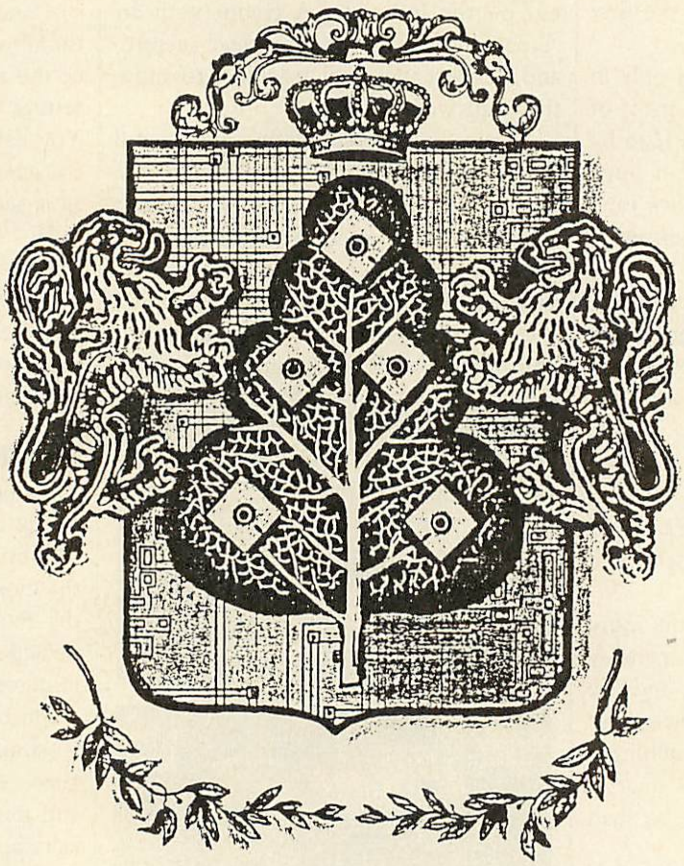
Even then, the available contrast wasn't as good as it had been on the other two monitors. Furthermore, the Sony monitor noticeably distorted the picture at the very top of the screen.

Sony's Trinitron display tube is curved across its face but it is practically flat up and down the screen. After you're used to fully curved screens, the flatness causes an optical illusion. The picture appears to be squashed in at the sides, giving an odd 'hourglass-waisted' look to the display.

Three of a kind?

Of the three monitors, I'd pick the Taxan to put on my desk. The advantage of having the preset controls so the picture looks the same size in every mode, a good display (particularly after the brightness had been cured) and a reasonable price make it the best bet.

However the Eizo could be an equally good buy for the home. The display is as good, it's cheaper and the only real niggle is lack of individual picture controls for each mode.



TREE OF KNOWLEDGE

It's common to trace your ancestry. Dave Futcher finds some software that gets to the root of it

Researching family history has been described as a cross between a good detective story and a jigsaw puzzle! In the last 20 years there has been an explosion of interest in the subject.

This may be due to the changing social conditions which have moved many people away from their places of origin and that some people find it difficult to relate to their new environment. It is a natural step for them to start searching for their 'roots'.

Whatever the reason, working on a family history generates a considerable amount of information. This has been traditionally held on paper. However, many of the tasks that a genealogist undertakes can be greatly assisted by a well designed suite of computer programs. Family history research is very popular in the US and a range of computer programs have been available on IBM PC compatibles for a number of years. Until recently the BBC micro was poorly served in comparison.

In recent months there has been a spate of new packages. These include *Kinship* from BBC Soft and *Ancestry* from Minerva. In addition Micro-Aid has released a further enhanced version of its original *Family History System* BBC package and has promised an Archimedes version soon.

Although some of the needs of the genealogist can be solved by a general database package like *ViewStore* or *System Delta* from Minerva, the genealogist really needs a specialist package. What then do these packages have to offer?

Family History System

The *Family History System* from Micro-Aid has been around in various guises for five years. It was written by a genealogist turned programmer.

The program has been a firm favourite with anyone researching their family history with access to a BBC micro. It has been considerably improved and enhanced in the course of time but the similarities remain with the 'Tree' modules of the original package.

There are four main programs and three subsidiary ones. There are also some demonstration files including one on the Royal family.

The 'ETree' program is designed to record details of people and the marriages that relate to them. The program has the important function of keeping the family records up to date by adding, deleting and amending as more information is obtained. 'ETree' allows you to browse through the family and print out ancestors or descendants.

'PTree' is used for printing out the family tree in a more conventional genealogical manner using continuous stationery linking family and generation lines. It can also produce a sorted listing of people by using a name and date of birth. 'CTree' is used to convert data from 'ETree' format to 'EFile' format and to other formats for transmission to other database systems and other computers such as the Morman IGI standard sort, or for special headed listings in any order.

The final converter program 'GedCom' is supplied to change an 'ETree' file into a suitable format for use by the Morman Personal Ancestral File programs, after transfer by modem or direct transfer to another computer or for reading into an IBM PC or compatible.

Versions of 'The Family History System' are available for all models of the BBC micro series and Master owners can use the BAS128 version of BBC Basic supplied to give more than double the space for names than the standard model B version. The amount of data that *The Family History System* can hold depends on the version being used. The BBC model B version is limited to 300 people and 100 marriages, the Master series version can hold records of 750 people and 250 marriages.

The new Archimedes version combines the modules into one program. There are some other improvements too, such as 'Trace' which now works from person references and not just marriages.

All the menus run in the Arc's emulation of mode 7 but mode 16 is used for viewing the data. There is an option to view in a screen width of 39, 79 or 131 characters but the graphics potential of the screen display of the Arc is not grasped in any way! The great advantage of the Archimedes version is that it can cope with between 2750 and 6000 people and 750 and 2750 marriages.

Ancestry

Minerva's program takes the fullest advantage of the power of the Archimedes. It has been specially written in Basic V and Arm code and is in no

ILLUSTRATION BY SHONA CAMERON

way a conversion. Like other Minerva software, it operates in an easy to use Wimp environment.

With a 1Mb machine *Ancestry* can hold over 3000 records. However, if you are also employing a User File this is limited to 1000 by the capacity of an 800K floppy disc. With a 4Mbyte machine and a 20Mb hard disc you can store in excess of 10,000 records.

Ancestry operates in two modes. These are the Tree and Card modes. The Tree mode is superb. When it is selected the main screen acts as a window on the complete family tree you have loaded or are creating, showing a section of the whole database on the screen.

Each small card shows all the essential details like title, name, royal house, date of birth and death. Normally there are six or seven tree cards displayed at one time in this mode.

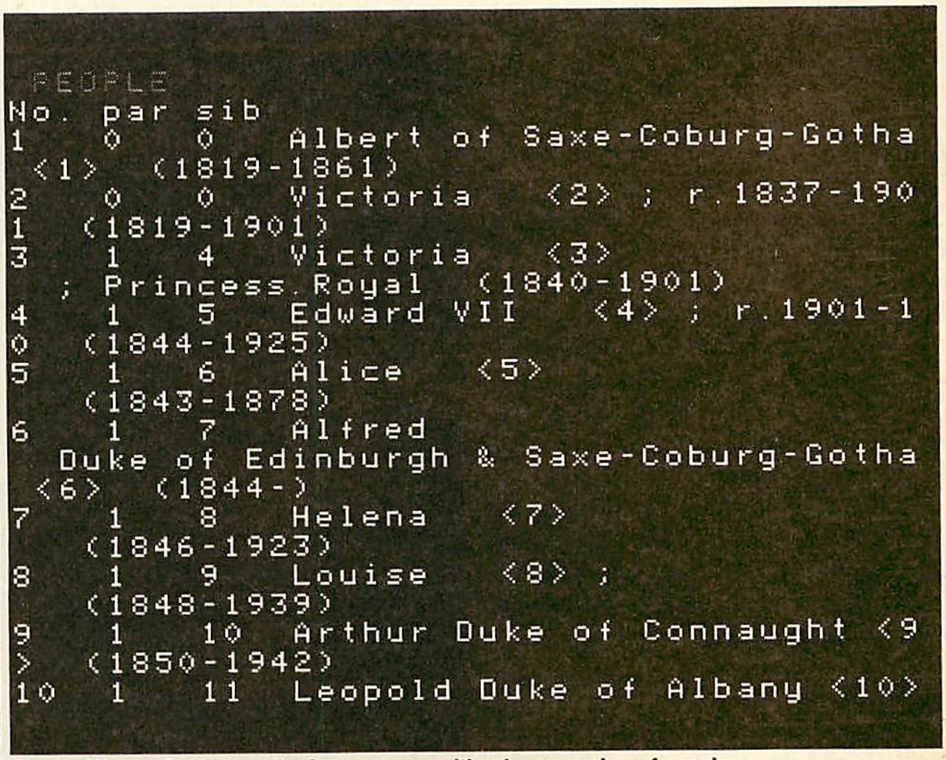
The central card of the display is outlined in blue and you can switch the central card to another subject by clicking one of the other cards. The window then moves to bring the new central card into the screen window. This makes moving around the tree easy.

The most amazing feature of *Ancestry* is the zoom facility to gain access to a subject's individual record card. This is achieved by clicking on the central subject card which brings up a full display of the person in question.

The top section of the first page provides 10 basic and standard pieces of information – surname at birth, forenames, bynames, sex, status, title, date of birth, place of birth, date of death and place of death. Beneath this the first page shows marriages and partnerships. While the second page lists the immediate family – father, mother, sisters, brother, sons, and daughters. If a User File has been created and loaded along with the database, a third screenful of information can be displayed and its content depends on the person creating the file.

The program has the facility to include a picture to be displayed in the bottom left corner. These pictures can be created with a digitizer, art package or the sprite editor on the Welcome disc.

Ancestry also has some powerful reporting facilities. All sorts of reports and charts can be created including those covering ancestors and descendents. In addition *Ancestry* has a full Report Generator which enables reports to be created that meet certain specified conditions set up by using Basic-like expressions.



Family History System on the Arc can cope with a huge number of people

Although *Ancestry* costs approximately three times the cost any of the other genealogical programs, it is in a different league. With it you will be able to input your data with considerable ease, marshall your family history facts, display them clearly and cross-reference them comprehensively and produce detailed reports and charts with tremendous ease.

Kinship

This is the latest release from BBC Soft. Interestingly, it was programmed by Graham Crow, who is also responsible for *Ancestry*.

Kinship has been specially written for the BBC Master 128, and is not available for any of the BBC micros. There are few packages specially designed to take advantage of the Master 128 but *Kinship* certainly does. For a start it uses only the ADFS filing system and it uses the sideways Ram for data storage.

Each person has a 'card' which holds the standard pieces of information that you would expect – surname, forename, date of birth and date of death. These records are loaded from disc into sideways Ram giving exceptional speed in both processing and screen displays. *Kinship* is limited to holding up to 250 records in memory at one time.

A further 15 fields of your own choosing can be added to each person's card to record occupation, hobbies, your information source – in fact, anything you wish. As this supplementary information is stored on disc, it is possible to have as many separate User Files as you wish, giving *Kinship* some unique expansion possibilities.

All the expected facilities for starting off and building up your own family history are available. Control is simple through the Database Menu screen and I cannot imagine anyone having any trouble in using the package at all.

The program really shows its strength when the Chart option is called from the main menu.The Chart screen shows a collection of cards that make up a section of a single family. The bottom right corner of the screen displays a list of cards used in the database and by moving up and down this scrolling list you can move to another part of the database with comparative ease.

Kinship is a good genealogical database without its User File and it is perfectly possible to obtain good results without using this facility at all but it is a welcome addition and for many users it will transform their use of the program. This makes the package more comprehensive than any other BBC based genealogical package. The possibility of adding 15 fields of up to 50 characters each really does supplement the seven standard fields in the normal database.

Kinship offers a variety of reports.

These include individual listing, family listing, ancestor chart, and descendant chart. The descendant chart option shows on screen or prints on paper the subject's descendants in the form of an indented listing. The number of generations can be set from between 1 and 40 and you can decide whether or not to include dates. Usefully the width of the indent can be altered too. The wider the indent the better the appearance of your descendants chart, but a combination of several generations and a wide indent can lead to the display wrapping round. You soon learn to choose your indent carefully.

A useful sideways chart printer, is also included for Epson FX-80 compatible printers. With this you can produce family trees printed sideways, so they fit on a run of fanfold paper.

Conclusion

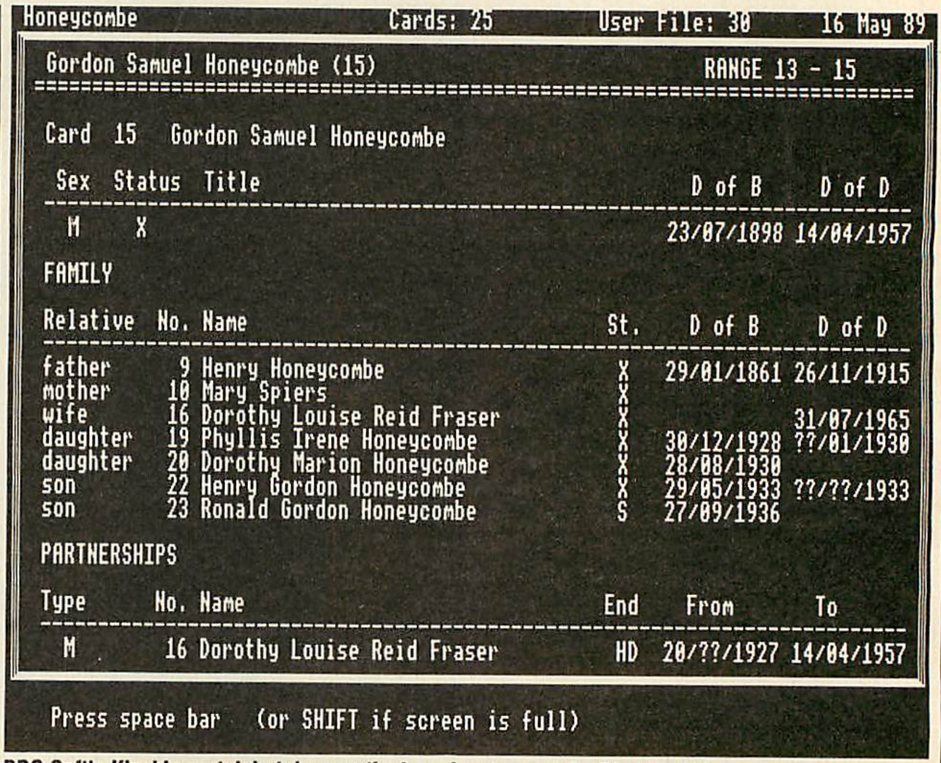
All the packages reviewed do their job well. Obviously when the power of the Archimedes is grasped in the way that Minerva grasps it, you have a package that is easier to control and get the best from. For the humble 8-bit micros, the older Micro-Aid package does perform all the serious tasks necessary from specialist software like this very well but the brand new *Kinship* has much to commend it using the Master 128 to great effect.

Choosing a genealogical database is not that straightforward. It is not just a question of screen display and ease of use. File size is important. Remember the number of ancestors doubles with each generation as you go backwards.

The data collected in family history research can be kept for many, many years and so its portability between different programs and computers must be considered. Exchanging data between different researchers can also be important to save re-entering data.

You should consider looking for packages able to accept or generate data in the internationally accepted formats. The Gedcom format is the accepted standard for the exchange of genealogical data between programs and machines. *The Family History System* offers this possibility and it would seem to be a serious omission in all the other packages. Although *Ancestry* does offer the export of Reports to disc as Comma and Tab Separated Values and to other databases, spreadsheets and other software.

Finally a word of warning. It is well known that family history searching is addictive and it could well occupy your leisure for the rest of your life. More than computing perhaps. If you do start or if you are already into it, good hunting. Combining genealogy with computing is the ideal answer.



BBC Soft's Kinship certainly takes particular advantage of the Master 128

Further information

Discovering your Family History by Don Steel. Published by BBC Enterprises, £5.95. *The Family Tree Detective* by Colin D Rogers. Published by Manchester University Press. *Beginning your Family History* by George Pelling. Published by Countryside Books, £3.50 and *Genealogy for Beginners* by Arthur J Willis and Molly Tatchell. Published by Phillimore & Co and costing £4.95.

The Federation of Family History Societies can be contacted at The Benson Room, Birmingham & Midland Institute, Margaret Street, Birmingham, B3 3BS.

The Society of Genealogists can be contacted at 14 Charterhouse Buildings, London, EC1M 7BA.

Ancestry. *£79.95 from Minerva Software, 69 Sidwell Street, Exeter, Devon, EX4 6PH.* Kinship *£29.95 from BBC Soft, 80 Wood Lane, London, W12 0TT.* The Family History System. *£21 (BBC/Master) £26 (Arc) Micro-Aid, Kildonan Courtyard, Barrhill, South Aryshire, KA26 0PS.*
Shields. £18.34 from Fernleaf Educational Software, 31 Old Road West, Gravesend, Kent DA11 0LH.

SHIELDS

Shields is an easy-to-use program for designing and printing out designs of shields, coats of arms and crests.

Although really developed by Fernleaf Educational Software for use in schools along with its historical simulations packages on Medieval England, the program does have potential for anyone interested in attempting to create a copy of a complete design for their own family coat of arms.

Many adults have long had a fascination and a desire to create their own coat of arms and this program provides a new opportunity.

However, the instructions make the point that *Shields* is not a highly sophisticated program. Nonetheless, it does a great job and provided you are not too ambitious it has much to offer.

A full range of ordinaries are possible – pile, saltire, cross, bend, quarterly, per pale, per bend, per chevron, fess, per fess, chevron, chief, pale, and inescutcheon. After choosing one of these you are able to decorate the shield from a choice of 10 devices.

The ordinaries and the devices can be coloured within the limits of the BBC's colour range and designs can be saved to disc and printed out to an Epson compatible printer. Colour is also possible if ESM's *Colour ScreenPrint* is used.

DIFFERENT STROKES

Rob Miller is drawn to *Art Nouveau,* a detailed new art package that's strokes ahead of its rival software

There must be something like a dozen art packages now for the Archimedes, so something new must be something special to get noticed. *Art Nouveau* from Computer Assisted Learning looks to be just the program to take the number one spot, overshadowing everything else currently available.

With a host of 'useful' rather than 'fancy' tools available, *Art Nouveau* beats all comers, including packages (OK, the package) costing four times its price. *Art Nouveau* will run on any Arc with 1Mb or more, including the new A3000. It appears to work happily under Risc OS as well as the old Arthur 1.2, although no use is made of Risc OS's multi-tasking.



Take your pick: develop your work of art by selecting the appropriate tool from the screen

There is no auto-boot on the disc. Instead a small configure program is run each time you wish to begin. This saves the current configuration to disc allowing you to 'reset' your machine when finished. On running the main program, the screen clears leaving only a cross-hair cursor present. Unlike most art packages on the Arc (and for that matter, any other micro) no use is made of icons – the tiny pictures representing different tools such as a pencil for 'draw' or a brush for 'paint'.

Instead, all options are available from a top menu-bar (similar to an Apple Mac) which appears whenever the middle button is depressed. This gives access to separate menus and then sub-menus.

For anyone familiar with the Risc OS desktop, the menu system is simple to use. Pointing at an option on the menu bar produces a drop-down menu. Sub-menus are then accessed by following the relevant arrow with the pointer.

All menus are displayed on kinds of 'metallic' plaques which give the whole program a very professional and hi-tec look. A status bar is also displayed whenever the main menu is selected. This gives you all the information you need about the currently selected brush, colour, and other options. It can get in the way sometimes but can fortunately be toggled on and off.

Even the border colour of the screen can be changed (something missing from every other mode 15 package I've seen) to suit the current screen (or perhaps your curtains). This may seem unimportant, but it's these small attentions to detail that make *Art Nouveau* so excellent.

The acid test

Never judge a book by it's cover and never judge a program by it's appearance. If it doesn't have the right stuff inside, you might as well forget it. There are three main functions I look for whenever I see an art program for the first time.

First, there must be freehand draw. That is you should be able to 'doodle' simply by pressing a button and moving the mouse around. Many other programs just allow you to draw with a line of dots but this gives a rough and broken line.

With the Arc's speed, it's possible to write a short 'doodle' program in Basic, so there is no excuse for omitting it. *Art Nouveau* allows you to draw smooth continuous lines easily. Full marks for the first stage.

Second, you must be able to fill an area with any colour or pattern. The flood-fill options in *Art Nouveau* are excellent. Not only can you use any of the 256 colours available, you can also use any block pattern or cut-out from elsewhere on the screen.

Cut-outs can be anything from one pixel to the full screen and irregular as well as regular cut-outs can be selected. Graded fills (like those found in *Proartisan*) allow pseudo-shading of areas. Unfortunately dithered, graded fills are not supported. As a consolation, there are 'shaped' fills which squeeze everything into the relevant area.

Finally, a pixel editor is a must. Although not the best I've seen, *Art Nouveau*'s editor is still good in that you can always see what you are working on.

Cursor-looking in either the x or y plane allows straight horizontal or vertical lines to be easily drawn. One minor fault is that unlike the rest of the program,

you cannot delete any mistakes made by just pressing a mouse button.

Ideally, a pixel editor should be just an enlarged window of part of the screen. As well as changing pixels, you should be able to use any of the drawing tools available in the window. This may seem adventurous, but *ArcPaint* (the freebie with Risc OS) manages it with ease. Any art package with these three features implemented (well) is all right by me. Any extras are bonuses but *Art Nouveau* has plenty.

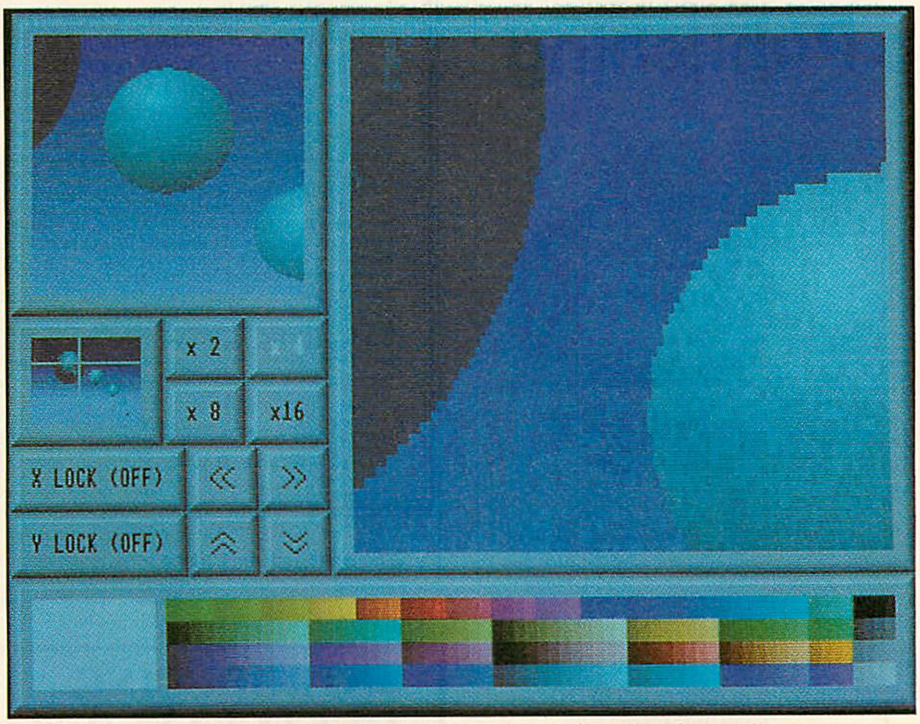
Extras

The most useful 'extra' has to be the 'scratch-pad'. This is a spare screen on which you can experiment with doodles, patterns and the like. *Art Nouveau* effectively has two screens that you can draw on, flipping between them whenever necessary. Brushes can be designed on one screen and then cut and pasted to the other. Irregular brushes (any shape) can be produced by first selecting a box around the desired area and then pasting that onto the scratch screen. A mask can easily be added (with the pixel editor if necessary) and the brush re-cut. Finally the mask can be made transparent, giving an irregular brush.

Using of the scratch screen with other tools gives *Art Nouveau* many more 'features' than are documented. It's only by experimentation that you can realise the full potential of this program.

As well as freehand drawing, there are a varied selection of effects that can be applied to any particular brush. Brushes can be any size from one pixel to 1279 by 1023. It is possible to warp the whole screen into any shape imaginable. Shears, flips, waves and 'squiggles' are all possible and with several applied in succession, you can achieve some pretty 'far-out' results. No wonder *Art Nouveau* was originally called 'Acid Art'!

As mentioned before, it is possible to produce masks by making a colour transparent. In *Art Nouveau* there is no limit on the number of transparent colours making multiple masks possible. The only problem with the brushes is that they cannot be 'painted' off the left hand side or bottom of the screen, due to the cursor being limited to the screen area. A larger 'MOUSE RECTANGLE' statement should have overcome this.



Pixel Editor makes tidying up easier because you can get close ups of your picture

Perfect pixels

The pixel editor is one of four editors available within *Art Nouveau*. A full screen font editor allows characters to be copied, scrolled or inverted and defined. A pattern editor and cycle editor make up the four. Cycles are used in graded flood fills and can consist of up to 32 different colours.

A full selection of lines and curves are supported and these can be placed accurately using the definable grid. Whereas most art packages allow a limited number of settings, *Art Nouveau* allows you to define a grid with any x and y dimensions up to 1279 x 1023 – the whole screen!

As well as the usual triangles, rectangles and so on, *Art Nouveau* lets you define your own outlines that can be scaled and rotated anywhere on the screen. Unfortunately this seems to be the only thing you can rotate in the whole program. It would be nice to have a rotate facility in the brush effects menu.

Bezier curves are supported – you can mark two points and then 'stretch' a curved line between them. Once the line is fixed though, there is no way of changing it (as there is in Risc OS, *ArcDraw*). In addition lines don't link together so it is difficult to produce a continuous smooth curve. Perhaps a later version making use of the new Risc OS graphic primitives will include this? Compatibility with other art packages such as *Artisan* and *Proartisan* is no problem with options to load either mode 15 or mode 12 screens. Although the picture comes across OK, the palette on a mode 12 screen does not, leaving you to make any changes by hand. It should not be difficult to match the defined mode 12 palette against the fixed mode 15 palette using the Risc OS module.

As well as straight load and save, screens can be 'imported' into selected areas as well as distorted into any shape. The other way in which pictures can be 'stored' is by printing them out. *Art Nouveau* supports both monochrome and colour Epson standard printers. A nice touch to the monochrome dump is that it allows you to preview the tone dump on-screen before printing. Tones can then be changed to get the best contrast.

There are many more features to relate – whole screen movement for example. Suffice it to say that they are all useful, well implemented and easy to use.

Conclusion

Art Nouveau stands way above anything available for the Archimedes so far.

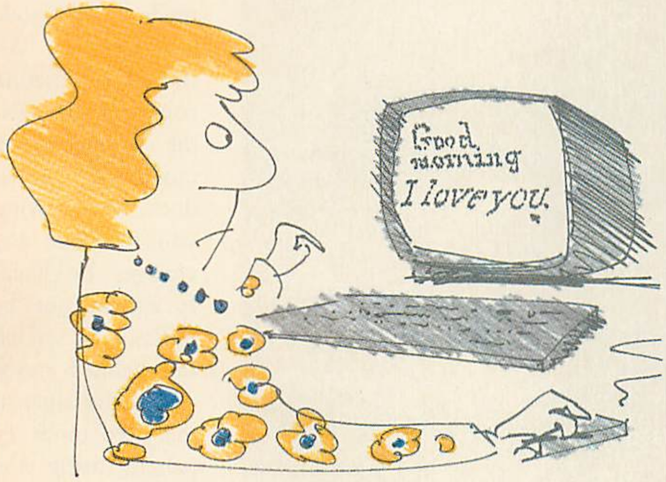
If the few niggles are sorted out and the manual made a little clearer, there is no reason why *Art Nouveau* should not be regarded as the definitive art package for the Archimedes, and the asking price of only £40 + VAT alone should be reason enough for buying it.

Art Nouveau *£42.50 from Computer Assisted Learning, Strathclyde Business Centre, New Stevenston, Strathclyde ML1 4JB.*

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Desktop publishers can save a great deal of money and time if they have the right system. Choosing this system is not easy. There is intense competition in the field of DTP, and developments are taking place at a bewildering rate. This book aims to give the buyer all the information required to make exactly the right selection. It contains clear explanations of: what desktop publishing is; the type of publications that are ideal for the process; the many uses of DTP systems; businesses to which DTP is suited; the skills required.

David Hewson is the founder and publisher of *The Wordsmith*, a bi-monthly magazine for writers and publishers using new technology.

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PIN MONEY

Just when you thought you had all the pins you need, Epson has come up with more. Geoff Bains says the 48-pin printer is the shape of things to come

Although it is unlikely many *BAU* readers will ever contemplate buying a printer costing £2529, the Epson TLQ-4800 is nevertheless of interest to all micro users.

The TLQ-4800 is a 48-pin dot-matrix printer. Just as 9-pin dot-matrix printers have been largely superceded by superior 24-pin models, the days of 24-pin printers are also numbered. The TLQ-4800 is the first of this new generation of printers.

Just as 24-pin printers use two rows of 12 pins, staggered so the printed dots overlap, so the TLQ-4800 uses four rows, all staggered. This gives characters made up of a matrix of 29 x 46 dots in NLQ mode.

There's also a draft mode which moves the printhead over the paper faster to produce a 9 x 46 matrix.

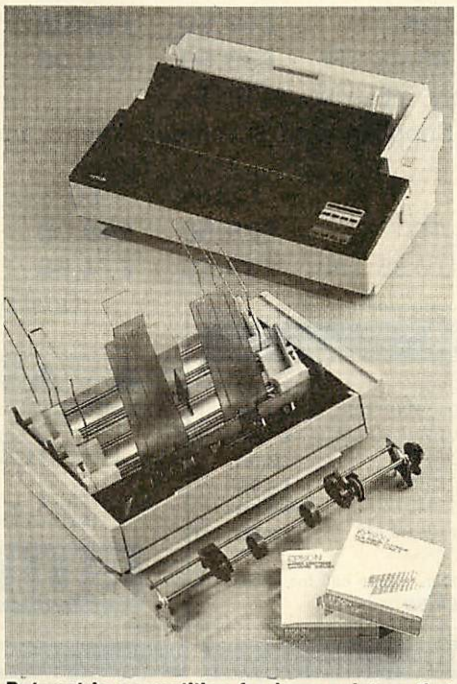
The quality is quite astounding. Characters are dark and crisp and barely discernible as dot-matrix printed. The print is as good as a cheap laser printer's with only the barest hint of 'dottiness' and ragged edges.

Speed

Unlike the jump from 9-pin to 24-pin, this jump to 48-pin has not produced a great speed increase. The advent of 24-pin printers meant the two-pass NLQ quality of 9-pin machines could be achieved with a single pass. This 48-pin printer can't do any better than that so its speed is similar to the faster 24-pin machines.

Epson claims the TLQ-4800 can print at 250CPS in draft mode and 83CPS in NLQ mode. Since all manufacturers' speed figures are somewhat optimistic, the TLQ-4800 was tested printing a typical page of text and it managed 125CPS in draft mode (20 seconds per page) and 55CPS in NLQ mode (about 45 seconds for each page). Although good speeds, these are beaten by many 24-pin models costing less than half the price of the TLQ-4800.

Although this printer uses twice as many pins as any other, in other respects it is the same in construction and use as 'normal' 24-pin printers. It is extremely large and robust and this no doubt contributes to the hefty price tag. The TLQ-4800 has thick plastic covers instead of the usual flimsy plastic ones and to get at the insides, the whole machine hinges apart like a photocopier.



Dot-matrix competition for laser printers that can print nine NLQ fonts – and well

```
DRAFT
!"£$%&'()*+,-./012345
6789:;<=>?@ABCDEFGHIJ
KLMNOPQRSTUVWXYZ[\]^_
`abcdefghijklmnopqrst

NLQ COURIER
!"£$%&'()*+,-./012345
6789:;<=>?@ABCDEFGHIJ
KLMNOPQRSTUVWXYZ[\]^_
`abcdefghijklmnopqrst

NLQ OCR-A

NLQ OCR-B

NLQ ORATOR

NLQ ORATOR-S

NLQ SCRIPT

NLQ ROMAN

NLQ SANS SERIF

NLQ PRESTIGE
```

This is also a wide carriage machine and it has a push feed tractor unit built in and cut sheet paper is loaded automatically, with the bail bar moved by the printer to enable printing right up to the top of a sheet of paper. Both Centronics and RS232 interfaces are standard.

Code of conduct

The Epson LQ standard provides for most printing effects ever likely to be required and the whole IBM PC characters set is provided. As well as the 'standard' effects such as underlined, italic, bold and proportionally spaced text in a large number of character sizes from 20CPI to 5CPI, all the characters can also be printed in outline or as 'shadows', in double height and with solid or broken lines below, above or even through the text. The TLQ-4800 has nine different NLQ styles built-in. These range from normal typewriter look-alikes to a handwriting imitation. Some styles are similar to one another but nonetheless, such a range is unusual.

The control panel includes a 20-character liquid crystal display and a static Ram-based menu of default settings. Even the separation of the printhead from the platten is controlled from the front panel instead of the usual lever inside the machine.

It is quite simply the price which will put off most potential buyers from the TLQ-4800. For this kind of money you could easily buy a cheap laser printer and still have change of £1000.

Nevertheless, the TLQ-4800 is an excellent printer, capable of the highest quality print, reasonably fast, easy to use and strongly constructed. It can also use fanfold paper and print carbon copies, which no laser printer can manage, and it is cheaper to run.

For now, though, the TLQ-4800 is simply a prophet of things to come. One day, as they say, all printers will be built this way.

The TLQ-4800 costs £2529 from Epson (UK) Ltd, Campus 100, Maylands Avenue, Hemel Hempstead HP2 7EZ. Tel: (0442) 61144.

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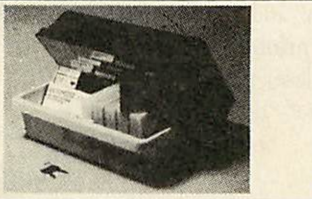
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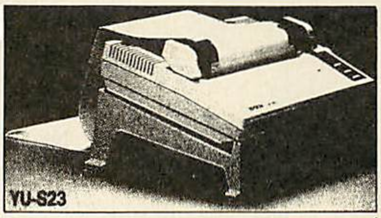
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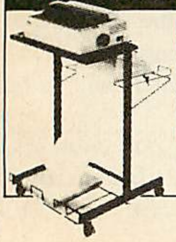


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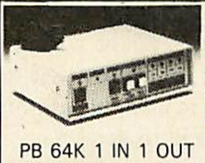
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WINDOWS OPEN ON LOW-COST COMMS

BBC Soft's ArcComm represents the budget approach to Archimedes comms. Ian Burley puts it through its paces

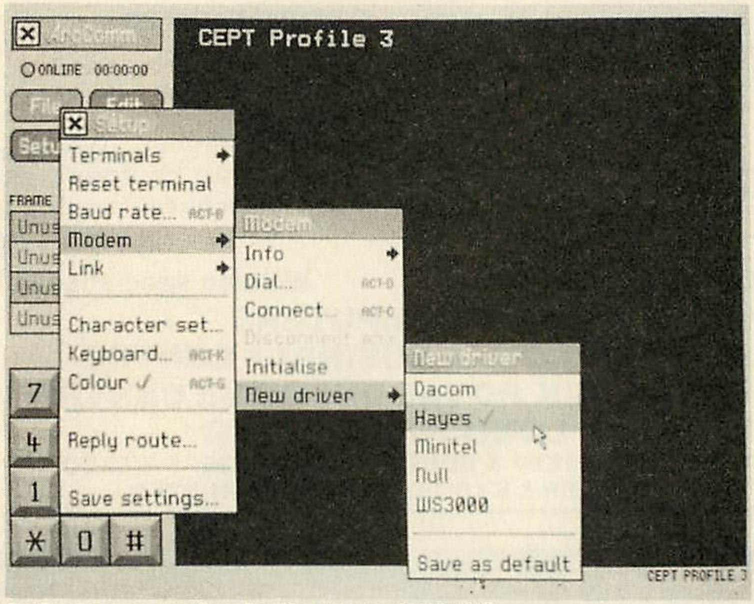
Until now, I would have recommended Beebug's *Hearsay* or The Serial Port's *Arcterm* to anyone looking for an Archimedes comms package. I reviewed both in *Acorn User* last December and concluded that *Hearsay* was going to be favoured more by conventional users while dedicated enthusiasts would probably go for the much more powerful and complicated *Arcterm*.

Now BBC Soft has launched into Archimedes comms with *ArcComm*, written by Pete Gaunt who, as many comms enthusiasts will remember, wrote BBC Soft's excellent *Modem Master* package for the Beeb.

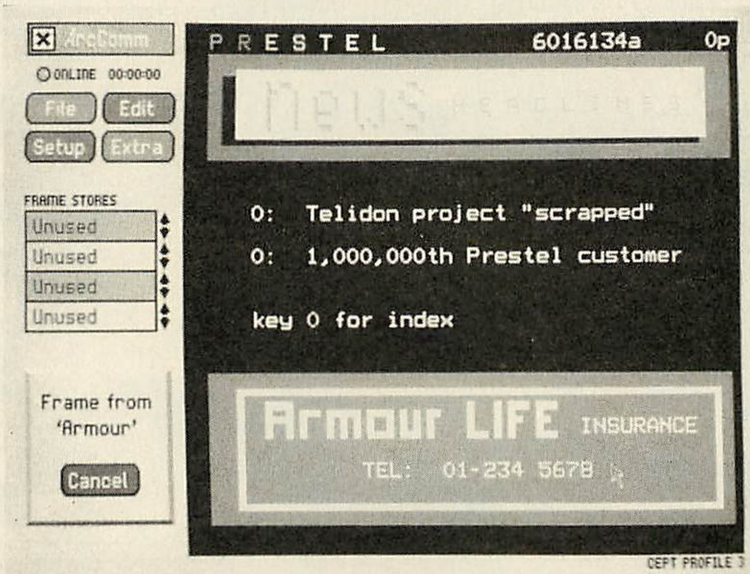
In true BBC Soft tradition, *ArcComm* is very inexpensive – just £29.95 compared with £69 for *Hearsay* and £49.95 for *Arcterm*.

If you haven't yet upgraded to Risc OS, and for some reason don't intend to, you can forget *ArcComm*. You can't even look at the two discs on an ordinary Archimedes as the discs are in the new extended ADFS format.

The system disc is unprotected and so backing up a working copy is straightforward enough, as is installing the program on the Risc OS menu bar. Click on the Risc OS icon and suddenly the Risc OS windowing front end disappears to be replaced by a full screen *ArcComm* environment, complete with redesigned windows.



ArcComm supports Cept Profile videotex levels 1-3



To benefit from ArcComm, you must have Risc OS

Frankly, I'm surprised BBC Soft felt like replacing the standard Risc OS windows. BBC Soft's windows look nicer but if everyone followed its lead, it could create confusion with some novice users and the Archimedes would lose its on-screen visual identity. At least though they operate in virtually the same way as ordinary windows.

One criticism of *ArcComm* is, that, there are some very tiresome pauses when you are clicking up initial menu windows, even after setting the font size to 24K, which is recommended to prevent excessive disc accessing when fetching text to the screen.

Within *ArcComm* the windows also seem a bit slow to draw and redraw.

It is possible to return to Risc OS and pop into Basic for example, without closing down *ArcComm*, and even to remain online in which case the *ArcComm* menu bar icon shows an animated warning.

ArcComm offers a puzzling combination of relatively low specifications – which makes it easy to use – and ambitious support for unusual display standards, including Cept Profile videotex levels 1 - 3.

Cept Profile 3 is the now aging viewdata standard which is used by Prestel. Cept Profile 2 is the Teletel standard used by millions of people in the government subsidised national videotex system in France, and Cept Profile Level 1, which is officially the new European standard, is best known to us through the German Bildschirmtext system.

Cept Profile 2 offers improved graphics and colouring over Profile 3, while Profile 1 is the most ambitious of all, offering 32 colours and higher resolution graphics while remaining upwards compatible with Profiles 2 and 3.

ArcComm is virtually unique in offering this range of videotex emulations. With Cept Profiles 1 and 2 it's clear that BBC

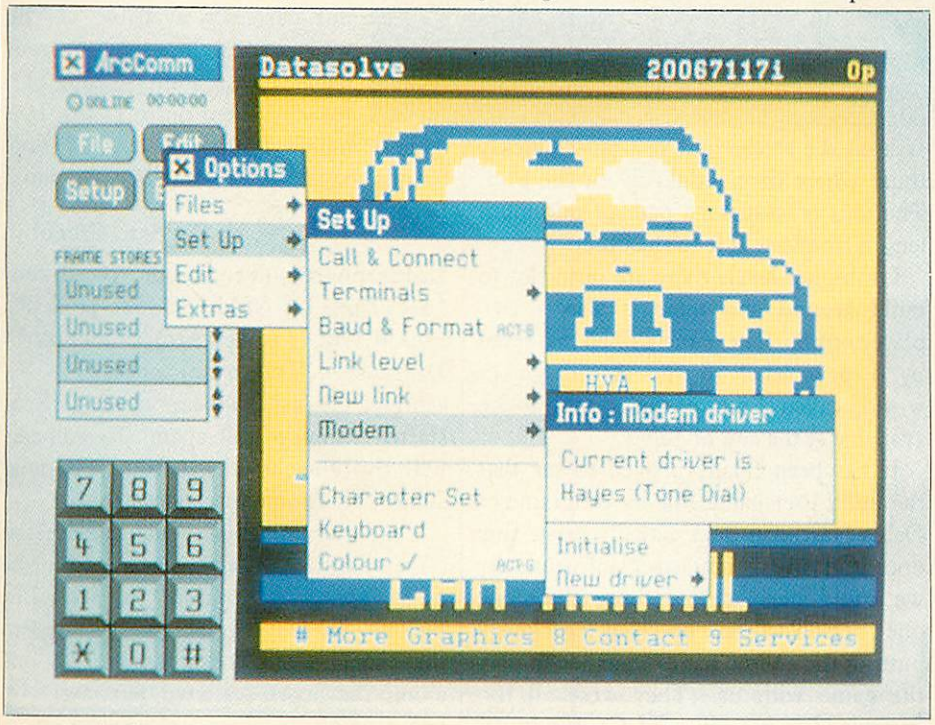
Soft expects both of these standards to become increasingly important to Archimedes owners. Perhaps we're about to see a major Archimedes invasion of the continent!

The Cept Profile 3 (Prestel) emulation is one of the best I have seen on any micro, even better than *Arcterm*'s impressive effort, since it fits into a windowed environment.

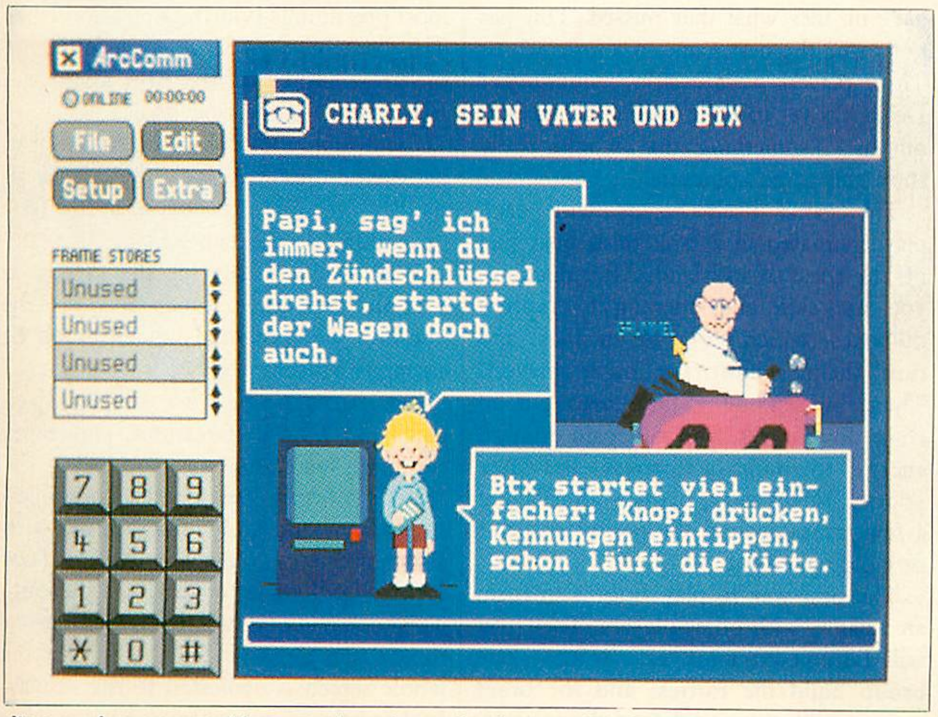
Characters are beautifully formed and you don't have to wait for the whole screen before flashing characters become visible – which was, if you remember, one criticism of *Hearsay*. The Teletel emulation looks equally impressive, as does Bildschirmtext. Visually, *ArcComm* is a hands-down winner.

However, the economy of features is exposed by a lack of graphics support in the offline mailbox editor – no graphic screen dump option, no page tagging and no telephone call log.

In its favour, *ArcComm* supports a cut-down version of the Prestel Vasscom error correction protocol – which is still quite a rarity among other comms packages – and the Archimedes pointer appears to be well used for page keying and auto-mailbox replying.



Visually, ArcComm is a winner – characters are beautifully formed



Its procedure command language is an innovative feature of ArcComm

There is also a CET telesoftware downloader, and this worked without problems although if I had a choice I'd quickly swap the online status LEDs for a more detailed progress box.

For the scrolling text terminal, there is adequate support in the form of teletype, VT52 VT102, and Ansi emulations. Smooth scrolling is another neat option. One *Hearsay* feature I miss with *ArcComm* is the ability to view up or down through the input buffer, scanning recently received text.

Only XModem and plain Ascii file transfers are offered. The absence of Kermit, let alone ZModem, YModem and others, is a matter of concern. Pete Gaunt assures me that additional file transfer protocol modules could be made available in the future if there was enough demand.

Modem support is adequate, if a little basic. Null, Hayes, Minitel, Dacom, and Miracom WS3000 modified Hayes drivers are provided.

One innovative feature of *ArcComm* is its procedure command language. Instead of, say, a telephone dial directory with each number set for the correct baud rate, terminal emulation and so on, all you need to do is set up the terminal as you wish and then save its status using the Save Procedure function. This produces an Ascii text file containing a ready made procedure.

A text editor can then be used to enhance the procedure, adding telephone numbers and dial pauses, as needed. Although the file is plain Ascii text, it must be *SETTYPE to D30 for it to be recognised by *ArcComm*.

If you are really ambitious, there is a selection of other commands which are available for you to customise the terminal even further, although it must be said that the facilities available aren't as versatile as *Arcterm*'s full-blown programming language.

All in all, *ArcComm* is an easy to use, relatively uncomplicated, and visually slick comms package, especially in the area of videotex.

Although advanced users may find the package a bit lacking, *ArcComm* could well become the best selling Archimedes comms package simply because of its price and ease of use.

ArcComm *is £29.95 from BBC Soft, BBC Enterprises, 80 Wood Lane, London W12 0TT. Tel: 01-743 0393.*

GAMES

HIGH SCORE UPDATE

Galaforce	30,840	Zachary Rae
Match Day	18 - 0	N Nebel
Labyrinth	366,740	Chris Harris

Remember *Stranded* from Heyley? Well you'll be seeing it again soon because Robico *(The Hunt, Enthar Seven)* has bought the rights to publish and will be doing so soon. But not before a few modifications have taken place to make it even better.

You'll recall that Heyley's *Stranded* had few graphical pictures to its name but the new version contains ample screen files according to Robico's Richard O'Leary. The parser has also been improved and minor changes have been made to the actual plot.

Present owners of Heyley's *Stranded* can receive an upgrade from Robico, paying only the price difference.

Robico is also coding an in-house adventure creator for use with future productions but the programmers hope that the creator will itself become one. I am told, however, this will not happen for some time, so you either take the plunge now – or wait!

Robico is doing stacks of stuff at the moment with another new adventure for the Archimedes. Called *Fugitive's Quest* it is set in 1952 and begins with the daunting prospect of a hangman's noose. You are a prisoner convicted of a murder you did not commit and must escape and return with enough evidence to clear your name. It promises 230 locations, plenty of 'photo-quality high resolution full colour graphics' (OTT?) and over 100K of text all in memory at once.

This at least is a relief. *Enthar Seven* was practically ruined by frequent disc access. All this comes on a disc accompanying a notebook for clues and mapping and even a Platinum ball pen embossed with the Robico logo!

Old *BAU* games hack David Lawrence is back on the games scene again, writing a new game similar in style to *Tetris*. As yet without a title, he says it will be visually like *Confusion* in that the display contains tiles on a grid. The object is like *Tetris* because it is simple but 'addictive' – you need to think ahead.

Pipeline sections appear in a selection area on the screen and you must quickly think where they should fit on the grid. The idea is to make a path of minimum length from one side to the other.

On higher levels there are obstacles to build around and there is also a two player option. The game will be marketed by a new label to the Acorn games world, called Empire, and ought to be available at the end of July.

It has been finally proved to me that the multi-user game *Bolo* by programmer Delos Harriman does actually exist. Boy does it exist! It's fantastic. Unfortunately we could persuade no more than one oher person to look up from ferociously putting the yellow pages together to play the game with us. (They were all too frightened in case Big Ed Geoff's 'save-the-world-shoes' became violent). They have no idea what they missed. This has got to be the best game in a long while. Three players were exciting enough but Delos has yet to try it on the claimed 16 micros – something that would really show this game's potential.

The game itself begins with each player situated in a tank on a boat just off the coast of an island. After docking, you use skill and cunning to capture pillboxes (which shoot at enemies) and turn them against the other players. Then, by sending a little man out to chop down trees, you can gain enough energy to build a fortress and lock yourself safely away, perhaps after laying a few mines around the perimeter fence or building a moat.

The best way to play *Bolo* is to form an alliance with other players. Then you will be able to work as a team – one group build the fortress and the other capture pillboxes and defend the fortress. But you can have traitors, and double agents! There is virtually no limit to the possibilities.

This game is very highly recommended. Although it is not currently available, if you want a copy then send me your name and address and I'll forward them on to Delos. It is most definitely worth it if you and some friends have access to three or more Beebs.

Sam Greenhill

Leaderboard: (Price not yet fixed) (Arc) from US Gold. Tel: 021-356 3388.
Holed Out: £19.95 (Arc) from Fourth Dimension. Tel: (0742) 700661.

Only in the last few years have the Brits started winning golf again. To coincide with this, the game has become a popular subject for computer coders.

On foreign machines, such as the Atari ST and Amiga, *Leaderboard* has been the most appealing option to would-be Faldo's. Now the game has migrated to the Arc but it doesn't venture alone along the acorn-scattered fairways. Accompanying it comes a product from Impact under the newly released and most prestigious Fourth Dimension label. The contender is *Holed Out*, following the great success of the BBC micro and Elk versions of the same game.

Incidentally both of us would like it to be known that we think the review of the BBC version of *Holed Out* in the June issue didn't do the game credit.

Both Arc releases hit the streets at roughly the same time, and so the question all potential buyers will be asking is which of the two is up to par.

The answer? Not so simple. Each game has a host of features, sometimes common, sometimes not.

Let's begin with the graphics. *Leaderboard* offers obvious qualities such as detailed trees and clouds but *Holed Out* seems slightly more aesthetically pleasing. This could be down to a number of things, the most evident being that the whole screen is dedicated to the display. In *Leaderboard,* information such as club selection, wind direction, etc, is constant-



Putting in Holed Out can be made easy by an overhead view

Left: Data constantly displayed on right hand side of screen

ly present in a strip down the right hand side, whereas *Holed Out* makes use of the Arc's window environment to update the data only when relevant.

Another thing we liked about the latter is the characters themselves. They are detailed to include creases in jeans and jackets, something that *Leaderboard* lacks. Apart from these variations, there is little difference between the two games in graphics terms.

Sound is definitely a feature of *Holed Out*. There are samples for all sorts of situations: hitting trees, splashing into water, dropping into the hole and of course whacking the ball. However, the sounds in *Leaderboard* are somewhat meagre, as if they were added last thing.

Game play itself is the most important thing and both games score very highly on this front. The club selection in *Holed Out* is done very nicely, you can select from a list with the mouse, but *Leaderboard* makes it a chore by having you go through your club bag in search of the required piece. Once you know what you're doing, aim the crosshairs and let rip! The power indicator zooms up, and the trick is to stop it where you want it. In *Leaderboard*, on professional levels there is 'snap' to deal with – curling the ball round an obstacle – and although *Holed Out* has a similar mechanism, *Leaderboard* requires skill and this makes it far more realistic.

Speaking of realism, we would say the ball behaves much better in *Holed Out* in terms of rolling back down a hill if it wasn't hit hard enough, and such like. That's not to say that *Leaderboard* is a failure on this point. They both have good game play.

After many games, the two courses in *Holed Out* became quite familiar. I can see that unless Fourth Dimension releases further holes, this game could well become boring after a (long) while.

Leaderboard, on the other hand, has four different courses plus a limited facility for designing your own. This will give it a much longer life expectancy.

Putting is the only part of the course that is given a different perspective view by the two games. *Leaderboard* provides an effective isometric 3D effect while the overhead plan view of *Holed Out* makes it easier to judge distances and slope. However, this also makes it unrealistic. When have you ever seen Nick Faldo climbing a ladder to study the green? We can't decide, they're both good.

It would be nice to see some contoured fairways. As it stands both games are two-dimensionally aligned. However, niggles aside both come up to scratch in a fashionable manner. Both are worth getting, even if you're not a dedicated golf enthusiast.

Sam Greenhill
Andy Vanages

Send your high scores, hints, tips and other cheats, and details of new and exciting games to The Games Pages, BBC Acorn User, *20-26 Brunswick Place, London N1 6DJ.*

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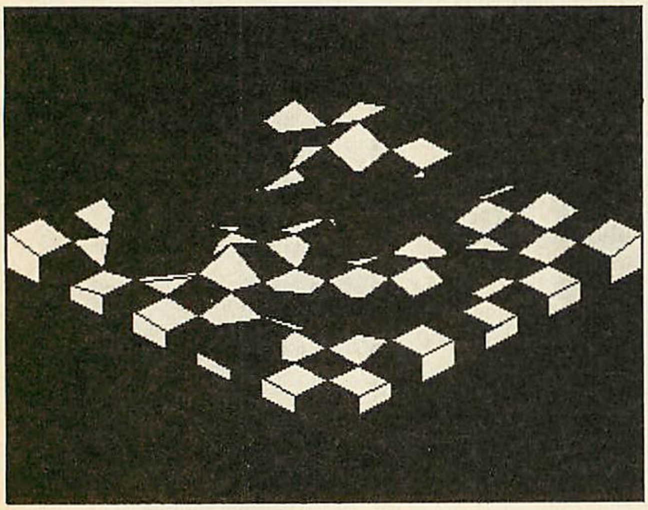
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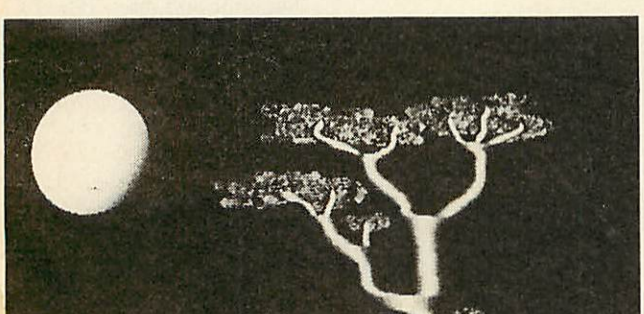


Next month's *BBC Acorn User* will bring the countryside to your monitor. Random landscapes are the order of the day. Hill and vale, dry land and ocean – you can create all in glorious technicolour on your Beeb or Archimedes.

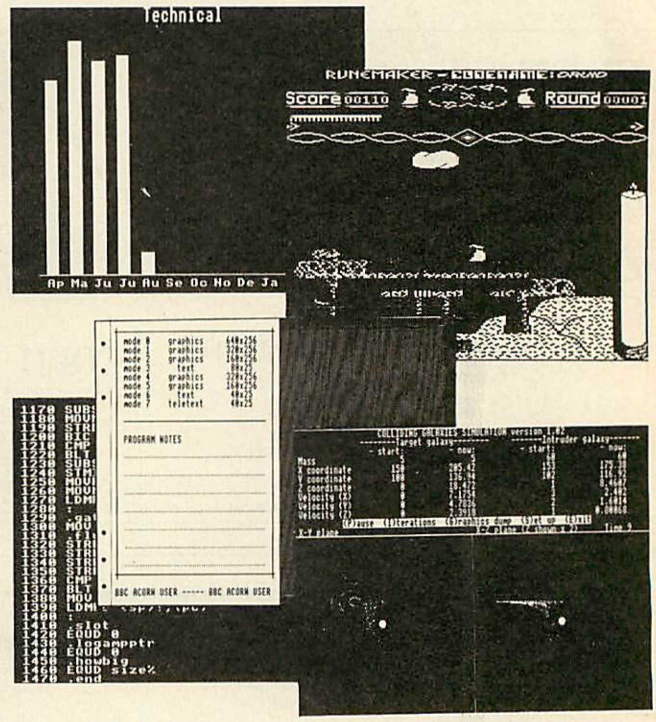
Just when you thought it was safe to go back to the printer, Postscript is back! The September *BAU* presents the ultimate screen dump with a graphics to Postscript converter.

Plus next month's *BAU* sees the start of a new series of programming languages and features reviews of *Atelier*, *Termin*, *Solidcad* and the Brainsoft multiple interface board for the Arc plus a look at the C programming language – is Beeb C really possible?

All this and news, hints, tips and much, much more in the indescribably wonderful September *BBC Acorn User*, on sale 10th August.



Can you do better?



As well as articles and programs from the *BBC Acorn User* regular team of experts and know-it-alls, *BAU* also has many features from complete newcomers to publishing, from BBC micro and Arc users who have never dreamt of submitting material to a mag before – from people like you.

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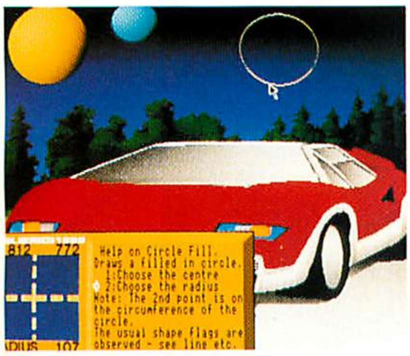
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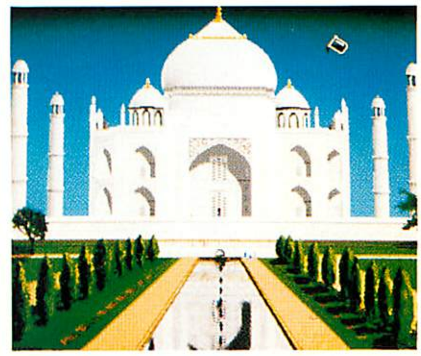
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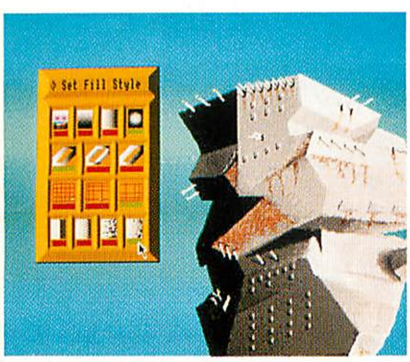
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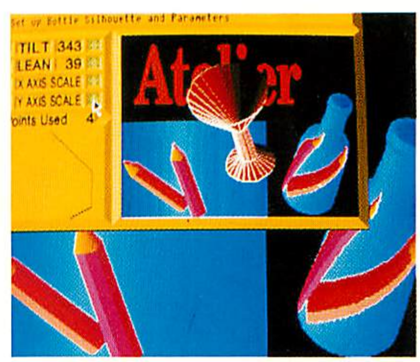
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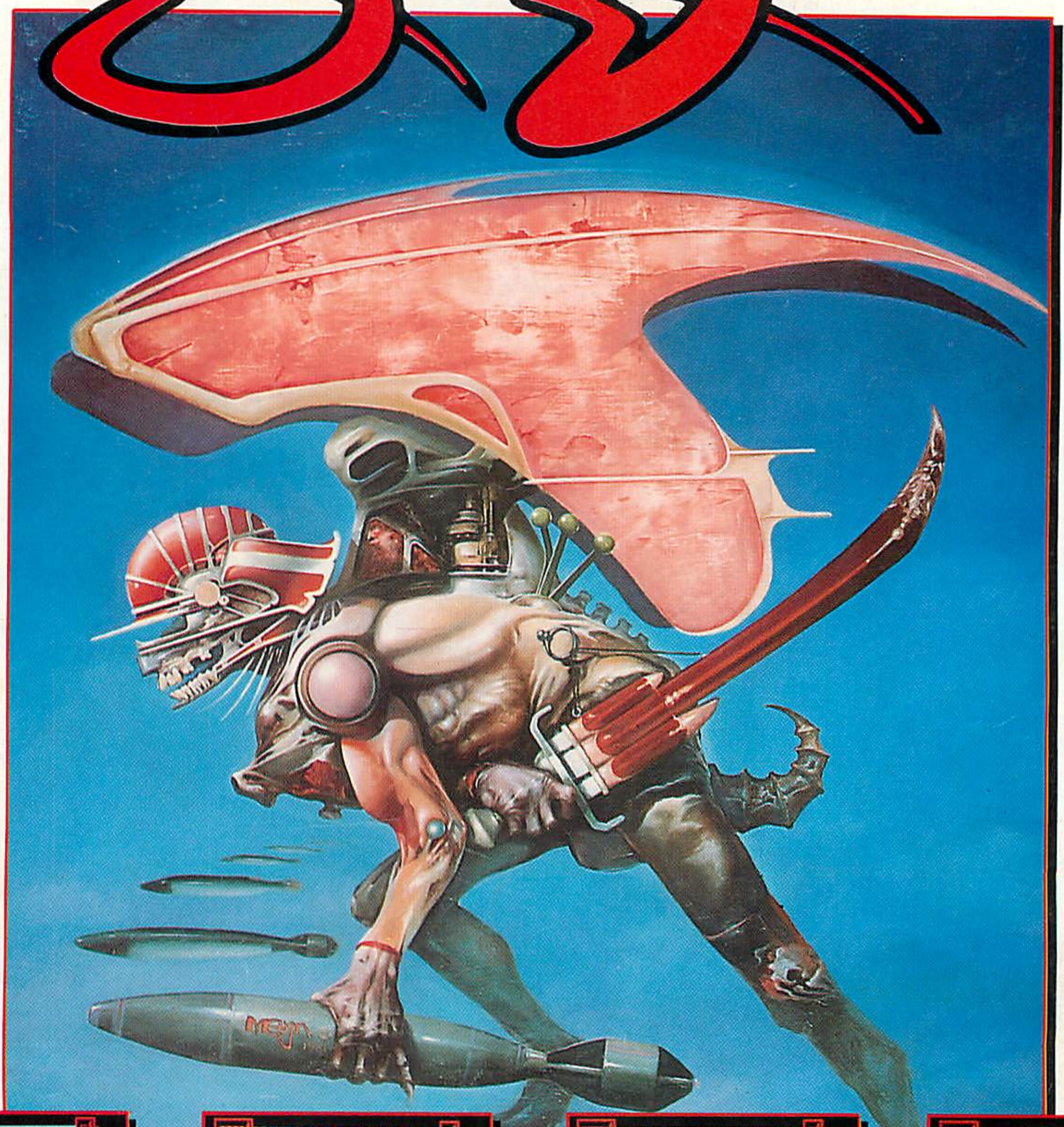
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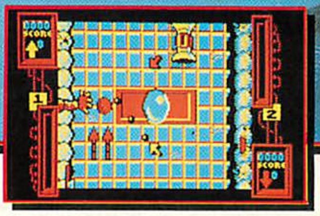
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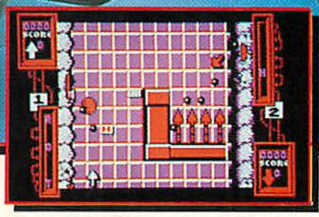
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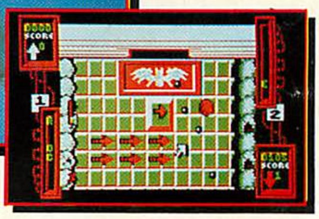
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(The screen pictures show the BBC Micro version of the game.)

GAME FEATURES

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- BUMPERS bounce balls all over,
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